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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of

Practical Therapeutics

Edited by

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Issued on the 15th of each month.

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ORIGINAL COMMUNICATIONS.

GASTROINTESTINAL MANAGEMENT OF TUBERCULOSIS.

BY MARTIN E. REHFUSS, M.D.,

Associate in Medicine in the Jefferson Medical College, Philadelphia.

There is no part of the treatment of the average case of pulmonary tuberculosis which is of more importance than the proper handling of the gastrointestinal tract. When this part of the organism becomes affected by disease, the difficulties encountered in successful treatment are very much enhanced. I have made a careful study of a number of cases of tuberculosis of the rather intractable sort from a gastrointestinal standpoint, and the following factors have been to my mind largely contributory in producing resistance to healing:

1. *Infection:* The presence of focal infection in tuberculous individuals is being more carefully sought for every day. The difficulty, however, has been that not merely are there tonsillar, pharyngeal, postnasal, sinus, bronchial, and pulmonary infections, but the internist has overlooked the possibility of infections of the gastrointestinal tract as a potent factor in producing lessened resistance. In five cases I have been able to demonstrate infection of bile, in three cases by careful technique there was a colon bacilluria, in one case there was undoubtedly an infection of the gastric mucous membrane, while not infrequently there are evidences of intestinal infection, varying all the way from stasis to an infective colitis. These points are extremely important, and in every resistant case of pulmonary tuberculosis a careful search should be made, and by a careful search I mean not merely the oropharyngeal infections, but the infections of the viscera. Positive findings demand rigorous elimination of the infections, by direct disinfection, vaccine therapy, etc. Only recently the possibility of food infection has seemed to me a likely factor in accounting for some of the gastrointestinal crises seen in the course of this disease.

2. *Gastric Disease:* True gastric tuberculosis, in the form of ulcer, miliary tuberculosis, or a diffuse tuberculous process, is rare—a disturbance in gastric function is almost constant. In fact we all know that the incipient form of the disease is frequently ushered in by gastric symptoms, and the gastroenterologist not infrequently becomes the clearing house for many of these cases. We find all sorts of statements in the literature, but the fact remains that an intact gastrointestinal tract is the best form of insurance against either active tuberculosis or the control of a tuberculous lesion. Some observers go so far as to make a prognosis on the condition of the gastrointestinal tract, and one author, Campo, makes the statement that when gastric dilatation intervenes, it is practically equivalent to a death-warrant in the disease. I have studied the gastrointestinal tract of a number of tuberculous individuals, and the results of Mohler and Funk of the Jefferson Hospital seem fully warranted. The following points seem to me the most important.

(*a*) On the empty or rather the fasting

stomach, certain definite factors are present —first an increase in gastric mucus and the presence of muco-pus of extragastric origin. This muco-pus, and not infrequently pure pus, is the swallowed material from the bronchioles and contains in many instances the tubercle bacillus. One author made the statement that it is easier to find the tubercle bacillus in the material of the fasting stomach than it is to detect it in the sputum. The characteristics of extragastric swallowed pus are, first, its discrete character, floating in the gastric contents rather than being intimately mixed with it; secondly, the evidences of upper respiratory and oral contamination, as shown by the presence of epithelia of these portions of the tract; thirdly, it is frequently aerated, having a tendency to float on the surface or toward the top of the removed specimen. In this material, properly centrifugalized, treated, and stained, the tubercle bacillus will be found in as high as 98 per cent of cases. The material is not merely impregnated with the tubercle bacillus, but also a number of secondary pus-producing organisms. The danger of these organisms is in direct proportion to the reduction in acidity. In antacid and subacid stomachs the association of an active gastritis and the above findings emphasize but one thing, an induced gastritis due to the action of swallowed infected material. That this material can infect the stomach is evident from one case which I studied, and which coincides with all the postulates which I laid down for that of infected gastritis.

(*b*) There is unquestionably induced a change in gastric function; this change is toward a delay and reduction in the gastric secretion and toward a gradual delay in evacuation, factors frequently seen in gastritis. Sooner or later this change brings about symptoms. Whether these changes occur through disturbances in the vagus, or the plexuses of Auerbach and Meissner (Amato), or through circulating toxins, or finally through a directly induced gastritis, is not clear, but sooner or later there is reduction in gastric tonus, atony, delayed evacuation, and a disturbance in mucosal activity evidenced principally by "delayed secretory digestion." The splash, the atony, is seen sooner or later in almost every case of active phthisis. Not merely is this the case, but it is possible by therapy to restore the stomach to normal, as I have been able to demonstrate. Every form of gastritis, atony, and dilatation may be encountered, while the phenomena of disordered enervation, heartburn, regurgitation of bile, reverse duodenal peristalsis, may all be encountered. Only an exact study of gastric function through the entire period of gastric digestion will demonstrate the above findings. They constitute, however, a basis for active treatment.

3. Pancreatic disease has been associated with pulmonary tuberculosis. In fact, the French observer Loeper has pointed out the association of pancreatic disease with pulmonary disease and insisted on the treatment of the condition with pancreatic organotherapy. A careful study will probably emphasize the association, but I cannot recall having seen any case in which there was pronounced evidence of pancreatic disease. In many instances fecal analysis will reveal a general reduction in the digestion of proteins, carbohydrates, and fats, a finding which may be interpreted as due either to pancreatic disturbances or to active intestinal infection, the latter being associated with pus, mucus, and not infrequently blood. True pancreatic tuberculosis, while rare, has been described. Functional pancreatic disturbances must occur, and Loeper states that one of the most interesting points regarding these cases is the question of the handling of the diet. The old method of markedly increasing milk and eggs might be well borne by some individuals, but the evidences of intestinal putrefaction and the presence of considerable undigested fat in the movements would definitely militate against the establishment of such a regimen. Furthermore, it is evident that such a marked increase in protein and fat increases to an alarming extent the work of organs such as

the kidneys and the liver. It has always been my conviction that the diet of the tuberculous individual should be a mixed diet with as much protein and carbohydrate as he can stand. This can only be determined by an examination of the movement. Such an examination will always emphasize the fact that starches above all other foods are most readily assimilated.

The indications, therefore, for the gastrointestinal management of tuberculous cases should include first an exact analysis of gastrointestinal function, and secondly a rational therapy destined to correct or improve the condition of these organs.

GASTROINTESTINAL EXAMINATION.

(1) Empty stomach, presence of swallowed pus, and evidences of infection.

(2) Digestive phase of gastric activity by fractional analysis, determining: duration of digestion, evidence of secretory anomalies, evidence of gastric infection, presence of late hypersecretion, increase of mucus, presence of pus.

(3) Duodenal intubation with culture of bile.

(4) Examination of the movement after a test diet which will demonstrate handling of protein, carbohydrate, and fat. Is there evidence of hepatic or pancreatic insufficiency? Is there mucus? Is the mucus catarrhal or infected or mucopurulent? Is the bile output normal? Perform high intestinal irrigation—is there intestinal statis? Putrefaction?

(5) Is there infected foci communicating with the gastrointestinal tract—teeth, pyorrhea, sinuses, postnasal, tonsillar, pharyngeal?

Knowledge of the above findings will do much to enable us to construct a satisfactory therapy. Naturally fresh air, rest in bed, and sunlight are above all indicated in these cases, but the essential factors mentioned above need specific therapy. Placing the last first, inasmuch as it frequently induces the trouble, if cultures of the upper oropharynx indicate infection, the thorough removal of the foci of infection by direct disinfection, and the use if necessary of autogenous or stock vaccines, may be indicated. No resistant case of tuberculosis should be allowed to remain with a focus of infection in this region, and gastrointestinal treatment has its beginning by the elimination of such foci. My experience in the analysis of these cases leads me to believe that very few cases are free from some such foci. I have noted on several occasions that failure to make progress was directly associated with such lesions. Occasionally there is no evidence on careful examination of such foci and the material found on the empty stomach is clearly coming from the lungs. Here measures destined to lessen secretion are indicated.

Regarding gastric therapy, if there is evidence of atony and delayed digestion, the following are usually indicated: Thorough gastric lavage, usually with the small fractional tube and with alkaline solutions, such as those of a weak solution of sodium bicarbonate, or liquor antisepticus alkalinus. After this material is completely aspirated, it is my practice to wash the stomach with distilled water and to apply directly to the mucous membrane through the tube either ¼ to ½ grain of silver nitrate, or silver iodide in colloidal solution. If the stronger solution of silver nitrate is used, after allowing it to be for some time (five to ten minutes) in contact with the gastric mucous membrane, it is reaspirated and the stomach completely evacuated. Such a procedure results in a maximum local action on the part of the silver and a minimum of systemic absorption.

If, however, there is evidence of gastritis, with considerable mucous formation, the mucus must be thoroughly removed with alkalies, of which the sodium bicarbonate and sodium phosphate lend themselves to local treatment. Coupled with this is usually a period during which secretion is lacking or its appearance is delayed. In these cases the use of hydrochloric acid is indicated. It may be administered in three ways:

(1) In water through a tube before meals.

(2) Fractional administration throughout the period of digestion; or

(3) For its direct local effect on the gastric mucous membrane by means of the Murphy drip, connecting the Murphy drip apparatus with the fractional gastric tube and using a solution of 0.2 or 0.25 absolute acid.

Another point of importance is the frequent association of visceroptosis. This nearly always means general atonicity of the smooth musculature throughout the body, a disturbance in the ductless glands, and as a result deficient food absorption. I have many times convinced myself that the application of adhesive bands for the purpose of replacing viscera and increasing abdominal tension will result in definite increase in weight when all other measures fail. The fact that this physical type is a general constitutional one and not simply confined to any single organ must be apparent to any observer of experience. The administration of the bacillus bulgaricus is of questionable utility. How much we can expect from the B. acidophilus I am not prepared to state. In severe cases of this nature the diet may have to be limited to milk, vegetables, cereals, and fruit, increasing markedly these substances to bring up the calorie value of the diet.

Regarding the diet in this disease, I am persuaded that the following are the indications: a high calorie diet, with as much protein as the patient can digest, at least half of which is vegetable, and as much fat as the patient can digest, both of these being controlled by fecal examination. Starch is a reliable factor, being nearly always well handled.

Feedings should be frequent; in fact, I am in favor of five well-graduated meals rather than three large ones, inasmuch as there is less likelihood of gastric distention and greater probability of intact gastrointestinal function. Our studies on the healthy man indicate that an average breakfast is handled in three to three and one-half hours. A glass of milk takes two and one-half hours; with an egg somewhat longer, three hours or more. A mixed diet with meat takes four hours or more, depending on the individual. In this disease, however, gastric evacuation is slow and gastric secretion is delayed. A mixed diet, therefore, of a breakfast of fruit, cereal, and milk, followed by a luncheon of chopped or scraped meat, starchy vegetables, bread, butter, and milk; a four-o'clock feeding of milk, or malted milk, rather than milk and egg; and a dinner of meat, chopped beef, or chicken, or lamb, or mutton, with starchy and green vegetables, milk pudding, or stewed fruit, is the ideal menu when it can be handled. The question as to the method of administration of milk naturally arises. Boiled milk produces the smallest curds, but it is constipating. Citrated milk likewise is supposed to produce small curds and be readily digested, while milk and eggs, producing small curds, lengthen the interval of gastric digestion. In the examination of the stomach I find eggs, the yolk of which contains 33 per cent of fat, the most questionable article, inasmuch as it is almost always accompanied by some delay in gastric digestion. It is possible to make the patient increase weight without eggs, and the presence of definite gastric delay interdicts fatty meats, like lamb, and the use of eggs and cream. If motility is normal all these dietary articles may be used. The old idea of markedly increasing the quantity of eggs and milk is not merely wrong from direct observation, but fecal studies will demonstrate a marked increase of unabsorbed fat. Meat when well handled is definitely indicated, and the high iron content of the mixed diet tends to counteract the anemia accompanying the disease.

One more point is of importance: in almost all cases there are evidences of autonomic imbalance, frequently in the direction of a well-marked vagotonia. This may occur associated with atony. In fact, in my experience a pure vagotonia or sympathicotonia is almost never seen. Such findings, with heightened nervous irritability, indicate the use of atropine, bromides, in aromatic or bitter combination, before meals.

THE TREATMENT OF ACUTE PULMONARY EDEMA.

BY CHARLES GREENE CUMSTON, B.S., M.D., GENEVA, SWITZERLAND.

Among my old urinary patients I have had the opportunity of changing from the rôle of surgeon to that of the internist, in very dramatic circumstances, namely, when in face of acute pulmonary edema. The treatment of this very serious affection has not received the attention it deserves in most text-books on the practice of medicine. Therefore these few lines.

Primo saignare! A rule never to be deviated from when dealing with a case of acute edema of the lungs. An attack of pulmonary edema is the triumph of bloodletting and in itself is quite enough to reestablish the practice so beloved by the physicians of Molière and the ancient Faculty of Paris. But also, it must be admitted, do we owe the return of this marvelous therapeutic means to the teachings derived from experience, and it is in our day that the extraordinary efficaciousness of bloodletting in the process under consideration has been explained.

By the withdrawal of from 300 to 400 grammes of blood from the general circulation, tension is decreased in the domain of the pulmonary artery and at the same stroke gives aid to the right heart struggling against hypertension. Likewise, by subtracting from the general circulation a certain amount of toxic products it decreases the cardiac spasm, resulting from the accumulation in the body of these products; and lastly, it protects those portions of the pulmonary parenchyma which are still in a normal condition against the serous inundation, by decreasing the afflux of blood which is obstructed in its flow in the involved areas.

Consequently, in a case of acute pulmonary edema one should perform venesection without delay, and I fancy there is not a man of any clinical experience who would not be in accord on this point. The less experienced man must not be led astray from this practice on account of the often extreme pallor of the patient. What is at the bottom of the condition of affairs is *asphyxia* and *not syncope*.

Read the splendid description of the affection in Dieulafoy (there is an English version) and a tyro could not fail in making a diagnosis of a case of acute pulmonary edema. Unfortunately, we English-speaking folk have not the gift of verbal painting, and it is needless to remark that works published in the language of Kultur are even more devoid of expression than our lesser Anglo-Saxon dispensers of medical literature. But let the embryo medical man read the French books on medical practice, Trusseau for example, although it is just a half-century since that great clinician went in search for the "Great Perhaps" of our confrère Rabelais, and he shall have a fairly good foundation in diagnosis of disease, even without microscope or Roentgen rays.

But let us return to our subject. In the vast majority of cases of acute pulmonary edema the letting of blood will immediately relieve. But in certain particularly serious instances of the process it is in itself not enough to accomplish its purpose, so that one must not overlook adjuvant medications which fulfil particular indications.

For the very redoubtable bronchoplegia, hypodermics of strychnine are indicated. Electrization of the pneumogastrics has been known to give good results. In order to combat disturbances of innervation, the existing periaortitis should be attended to by cauterization over the sternocostal area or by wet-cupping over this region. All ancient remedies, but very potent when properly applied!

Rectal administration of carbonic acid was successfully resorted to in one case by Teissier of Lyons, and the recovery of the patient may very well have been due to the action of the gas on the respiratory center, and also by increasing the pulmonary ven-

tilation. The gas kept up hematosis sufficiently for the patient to pull through the attack.

Puncture of the right auricle in the fourth right intercostal space with a long, fine needle has been done with the aim to rapidly deplete the excessive distention of the right heart. This procedure has been successfully resorted to by several writers and certainly merits attention.

Aspiration through a catheter introduced through a tracheotomy incision has been done, thus removing the liquid obstructing the respiratory field.

Acute pulmonary edema most commonly occurs in arteriosclerotic subjects to whom iodine in some form is being exhibited, and even in very small daily doses this drug has been known to be an accomplice in the production of this pulmonary process.

A number of years ago the writer was consulted by a gentleman of sixty-seven years of age, who was just beginning catheter life. He was desirous to have his prostate removed, but on the whole was a very poor surgical risk. He was 5 feet 7 inches tall, weighed 207 pounds, and offered an arterial tension of 23. However, he was told that if the tension could be brought down to 19 and his body weight reduced to 165 pounds the writer would attempt the suprapubic operation.

The patient was therefore placed upon a proper diet, ordered thiosinamin, 5 centigrammes in a pill to be taken after breakfast and one globule of riodine (Astier) after lunch and dinner for *twenty days each month.*

As a result of the treatment the patient lost 46 pounds in six months and the arterial tension was reduced to 18.5, so that, all things considered, the writer decided to operate. However, two days before the operation the patient suddenly developed acute pulmonary edema and weathered the storm after the removal of 350 Cc. of blood. He lived for some two years afterward, but of course in possession of his prostate.

It is to be noted that in this case repeated analysis of the urine never revealed the slightest evidence of any marked renal change, and that the heart-sounds were perfectly normal. Therefore, it would seem as if the iodine might be responsible for the pulmonary upset.

As a prophylactic measure, after a patient has been the subject of an attack of acute pulmonary edema, a milk diet should be continued for some time, and if necessary from 1 to 3 grammes of theobromine may be given in twenty-four hours. This treatment fulfils two important indications in the lesion under consideration, namely, the elimination of the toxins and a reduction of the arterial hypertension.

It goes without saying that the causal affection must be attended to, such as nephritis, aortitis, rheumatism, etc., but great care must be exercised in handling medicaments capable of provoking acute edema of the lungs.

Acute pulmonary edema occurring during pregnancy offers two therapeutic indications, namely, that directed to the respiratory and circulatory systems and that of the pregnant uterus. Therefore, every pregnant woman who is a cardiopath and who presents the slightest trace of albumin should be instantly put on a strict milk diet. If the edema develops, blood should instantly be let, the quantity removed being *proportional to the intensity of the dyspnea and not to the supposed resistance of the patient.*

If the patient recovers the uterus must be emptied, and if the pregnancy has reached the seventh month it is quite possible to have a living child. The writer is of the opinion that in proper hands, the Cæsarian operation should be seriously considered.

3, Rue Bellot, Geneva, Switzerland

A SIMPLE AND EFFICIENT METHOD OF PERINEAL REPAIR.

BY P. BROOKE BLAND, M.D.,
Assistant Professor of Gynecology, Jefferson Medical College; Gynecologist to St. Joseph's Hospital, Philadelphia.

In presenting the following method of perineal repair I do not lay claim to any new or original procedure. Indeed, of the vast number of operations described and performed for perineal restoration, practically

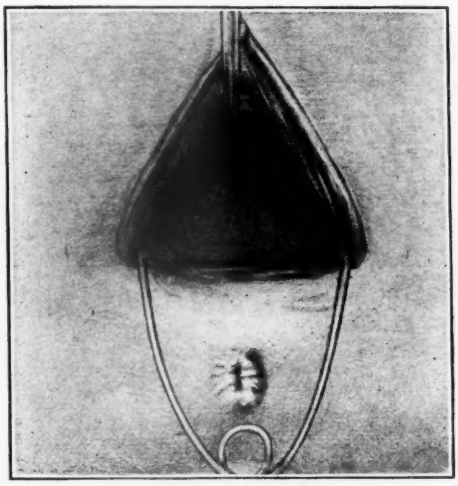

FIG. 1.—Perineal retractor in place. Vaginal wall grasped with Allis forceps exposing portion of vaginal wall to be excised.

all are modifications of the methods primarily originated by Hegar, Emmett, and Tait. All are based on the fundamental principles evolved and enunciated by these men. The old axiom, "There is nothing new under the sun," applies with equal poignancy and truth to perineal surgery as it does to all other fields of endeavor.

However, the present method is a combination of the plan developed by Emmett with the modification of A. P. Dudley, plus the addition of the interposition of the levator ani muscles and fascia as routinely and universally practiced to-day. The technique in the execution of these measures, however, has been simplified and therefore materially expedites the performance of the operation. At the same time, by abandoning the general practice of scissor separation and blunt or thumb and gauze dissection, we have, in performing all our work with free incisions by the scalpel, obtained better surfaces for union and thereby contributed considerably to the favor of primary healing. In addition, one will obtain less cicatrization, better anatomical and physiological restoration, and finer cosmetic results. Moreover, this method may be routinely applied to all degrees of perineal injury, whether superficial or deep, incomplete or complete; the latter, of course, always involving an initial restoration of the integrity of the wall of the bowel and the sphincter ani muscle. This operation can be performed in an unusually, almost incredibly, short space of time, and if followed according to the plan outlined, will result in a vaginal wall and skin perineum free from stiff, rigid, unyielding bands and a painful cicatricial floor and commissure. Indeed, one will build up a perineum that is smooth, contractile, tenderless, and obtain an anatomic restoration that approaches the ideal.

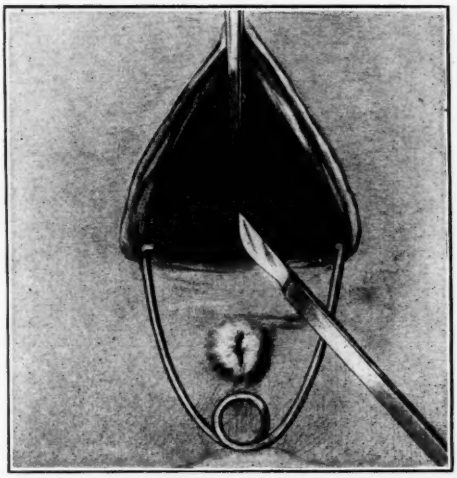

FIG. 2.—Median incision through thickness of vaginal wall.

In instituting the steps of this method of perineal correction, it is vitally important that the extent of the vaginal wall to be resected, not denuded, as originally prac-

ticed in perineal surgery, first should be accurately determined. The boundaries and topographical landmarks should be fixed and the vaginal walls should be made tense, first by introducing the perineal retractor, such as shown in Fig. 1, the points of which

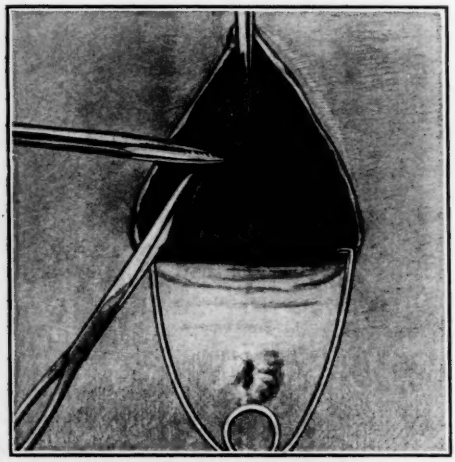

FIG. 3.—Showing dissection and resection of vaginal flaps.

should engage at the posterior carunculæ, or the hymenal remnants. These points should be made tense; and then, second, a site well above and beyond the apex or summit of the rectocele should be grasped by a modified Allis forceps. This should be pulled upward and backward in a line parallel with the external urethral meatus. This step is of the utmost importance, for in the great majority of perineal operations the surgeon fails to grasp this cardinal principle, with the result that he usually catches the rectocele too low. The general teaching to-day is to grasp the summit or apex (so-called) of the rectocele. This instruction is erroneous, faulty, and its practice means failure. Instead of the highest point or summit, the actual beginning of the relaxed or telescoped vaginal wall must be attacked, and this fact cannot be overemphasized. If this feature is not scrupulously observed and the resection only extends as high as the apex of the hernial protrusion and not beyond, the operator will be chagrined and surprised to find in a few weeks after the execution of his work the patient presenting herself with a mass or teat-like projection hurdling and extruding from the vaginal opening. Unfortunately this is a condition of perineal surgery that is entirely too common, and nearly all men have experienced this disappointing and troublesome sequence. The teat-like mass is a representation of the relaxed vaginal wall which the operator has failed to resect, and as a result he is forced to run to cover and hide under a multitude of excuses for the unsuccessful fruition of his task. Most operators are guilty of this sin of omission, and the error can only be avoided by starting well above the summit of the protrusion or just below

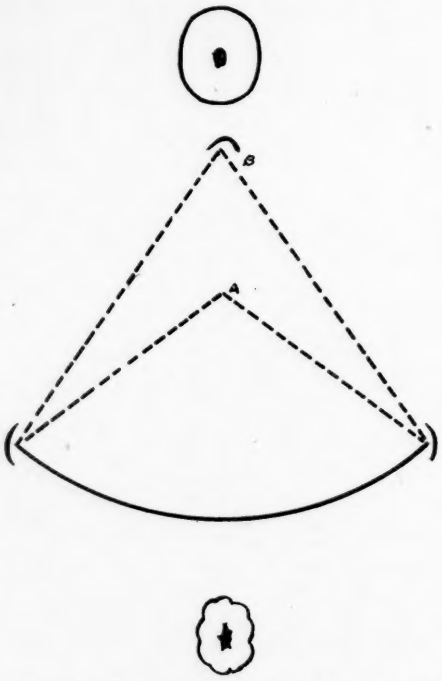

FIG. 4.—Schematic representation of the usual method of resection as commonly practiced to-day, beginning at the summit of the rectocele as represented at *A*, and the more extended method as outlined in this paper and indicated at *B*.

the posterior lip of the cervix. It is our custom to measure accurately the summit of the rectocele and then catch the relaxed vaginal wall an inch or more beyond this point. This denotes the site of the actual

beginning of the sliding or telescoping of the vaginal wall on the rectovaginal septum.

After outlining the landmarks, as have

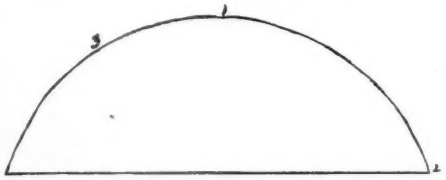

FIG. 5.—(*A*) Representing a side view of the common method of vaginal resection. (1) Summit of rectocele, (2) Muco-cutaneous junction. This is inefficient and allows subsequent protrusion of the inclining portion of the vaginal wall (3), and a reformation of the rectocele.

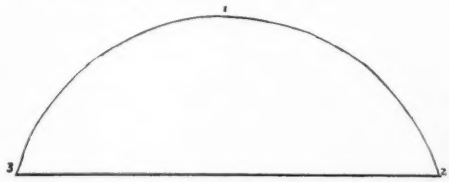

FIG. 5.—(*B*) Showing the method of resection outlined in this paper. Not only is the declining portion of the rectocele (1-2) excised, but also the inclining portion (3). This excision is absolutely necessary to overcome recurrence.

been described, and with the vaginal walls rendered tense by an assistant making firm but gentle traction with the perineal retractor and modified Allis forceps, a long free median line incision is made from the forceps to the mucocutaneous junction. Firm and steady traction is of the utmost importance. This results in lifting the vaginal wall from the rectal wall, stretching, as it were, the intervening fibroelastic rectovaginal septum. If traction is performed in the manner described, it is practically impossible to injure the rectal wall.

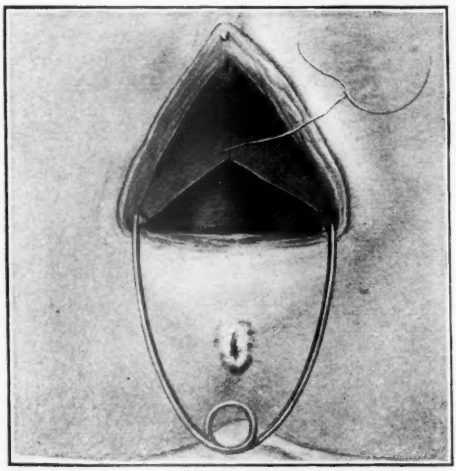

FIG. 6.—Introduction of first line of suture.

In making the vaginal incision, the operator should grasp a large-bellied scalpel and make a long, free, straight median incision through the entire thickness of the vaginal wall from the Allis forceps to the skin perineum (Fig. 2). This incision will allow the vaginal walls to retract. The margin of one side of the incision should then be grasped in tissue forceps and careful but free dissection made of the flaps of one side from the tissue forceps to the posterior caruncle or mucocutaneous boundary. This same procedure is then carried out on the opposite side, thus exposing or liberating a large triangular flap of vaginal wall on either side (Fig. 3). These flaps are then excised, and the excision includes the tissue held in the Allis forceps and also the tissue immediately beyond, thus making absolutely sure of still getting well above the tele-

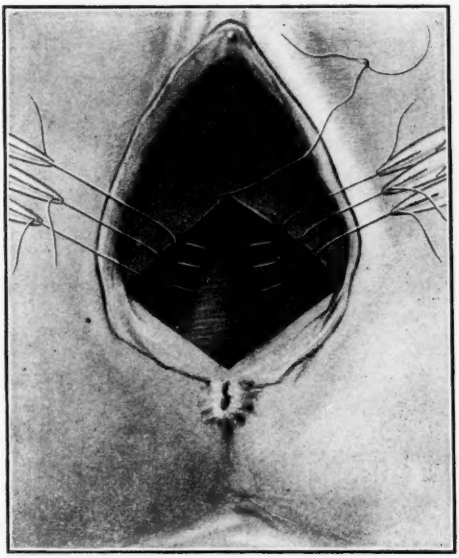

FIG. 7.—Sutures introduced through the deep pelvic muscles and fascia. When tied these structures are brought in contact in front of the anterior rectal wall and form a barrier against further rectal protrusion.

scoping plane and of removing all of the relaxed vaginal tissue.

Frequently we carry our lines of excision to a point immediately underneath the posterior cervical lip or well into the posterior vaginal fornix. Our observations and study

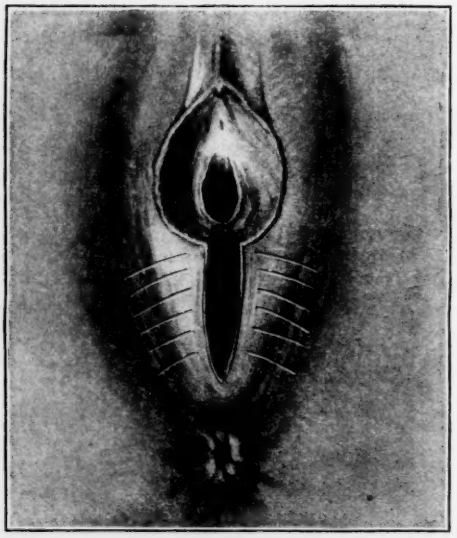

FIG. 8.—Vaginal flaps brought in contact in the median line over interposed muscles and fascia. Suture ending and tied at the posterior carunculæ or remnants of hymen. This diagram also shows buried sutures in the superficial perineal muscles and fascia as well as the introduction of the interrupted sutures in the skin perineum.

of a vast number of perineal corrections have led us to the *conviction that excision of the relaxed vaginal wall is habitually and erroneously performed too low* (Fig. 4). Therefore, to avoid the unsightly and irritable protrusion that results from the low excision we have gradually carried our incision and excision to the highest possible point. Since adopting this plan we have been able to eliminate the annoying feature of hurdling and postoperative protrusion (Fig. 5).

SELECTION OF SUTURE MATERIAL AND METHOD OF INTRODUCTION.

In introducing the sutures, we routinely begin at the highest point of the resected region or at the apex of the triangle (Fig. 6). We make it an unalterable rule to have *the first knot applied and tied on the unresected vaginal wall* immediately above the apex, thus avoiding a little projecting raw surface which may release a small vaginal artery. Inattention on the part of the operator to this fact may result in constant, annoying, and even serious postoperative bleeding. The selection of suture material is usually a matter of personal preference, but we see no special advantage in any of the non-absorbable materials and therefore they are never employed. Our routine custom is to select No. 1 twenty-day chromicized catgut throughout, both for the mucous membrane and skin perineum. We never utilize any other in doing plastic or reparative work. This material is threaded in a meium-sized, heavy, non-cutting-edge cervical needle. Two or three turns, sometimes four, are made with this suture in a continuous manner from the apex downward, always making sure of introducing the suture a quarter of an inch or more,

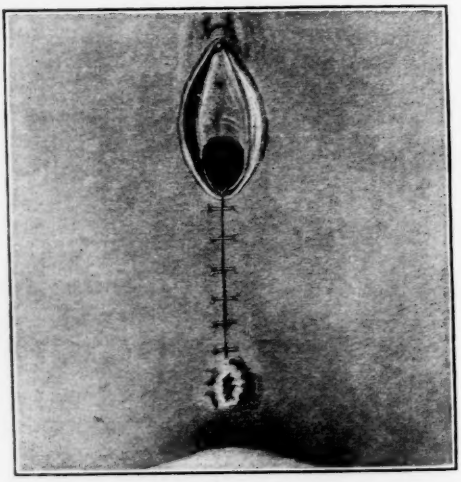

FIG. 9.—Operation complete.

never less, from the margin of the incision. In this way we make certain of getting good bites of the vaginal wall and overcome the possibility of tearing or cutting the delicate vaginal mucous membrane. After taking three or four turns of the continuous suture, it is placed aside, and then three or four buried sutures of the same material are in-

troduced with a view of bringing the levator ani muscles with their fascia, and the transverse perineal muscles with their fascia, in contact in the median line and over and in front of the anterior rectal wall (Fig. 7). We, in this way, endeavor to form or throw up a large bridge or barrier of musculofascial structure in front of the rectum and thereby obliterate the rectal protrusion. This interposition of the pelvic muscles and fascia is now quite universally practiced.

After accomplishing the transposition of the fascia and muscles, the vaginal wall is closed over these structures by continuing with the catgut suture primarily introduced at the apex of the resection. This suture is continued to the site of the posterior carunculæ or posterior vaginal commissure (Fig. 8). In its passage from above downward or from the apex to the base of the resected vaginal wall special care is always taken to include in each turn of the suture some of the rectal wall, pelvic fascia, and pelvic muscles. This is done to obliterate dead space, control bleeding, and bring in stout apposition all raw surfaces. After completing the vaginal suture and tying at the site mentioned, there still remains the skin perineum. If there is much relaxation in this region a few buried sutures of No. 1 chromicized catgut are introduced in order to bring the superficial perineal muscles and fascia together. If the skin perineum is superfluously relaxed it is gently resected, and if hemorrhoids are present these are taken off at the same time from above downward. The edges of the skin perineum are then approximated with interrupted fine chromicized catgut sutures (Fig. 9).

If the tear involves the sphincter ani and the anal wall, the steps of the operation would not be materially changed, the only difference, of course, being the very important step of freeing and restoring these structures by generous dissection from the surrounding immobilizing scar tissue, thereby giving free liberation and mobility of the anal wall and retracted sphincter fibers, factors absolutely essential to success. *Most of our operative failures for complete perineal laceration result largely from our lack of observation and recognition of these fundamental facts.* It is physically impossible for union to occur in tissue under tension.

We have been employing this method for several years. It is performed in a very short time. It is not complicated and hence of easy performance. Its simplicity makes it readily understandable. Free mobility of sutured flaps contributes favorably and generously to rapid healing and precludes the possibility of excessive and painful cicatrization. Hurdling or retelescoping of the vaginal wall or reformation of the hernial protrusion is completely obviated. It is efficient, and from an anatomical, physiological, and cosmetic standpoint offers better results than any method we have heretofore practiced.

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THE USE OF THE LONGITUDINAL SINUS FOR DIAGNOSIS AND TREATMENT.

At the recent meeting of the Section on Diseases of Children of the American Medical Association, Fischer presented a paper on this subject which may be summarized as follows:

The anatomical position of the longitudinal sinus beneath the anterior fontanel renders it very accessible in an infant up to the end of the second year. Its large size is another factor which aids in giving an infant the benefit of diagnostic and therapeutic measures which otherwise are difficult to obtain.

By the use of this sinus we have a direct channel through which a large or small quantity of blood can rapidly be taken from, or added to, the circulation. Since time counts a great deal in depleted and marasmic infants, the simpler the route the more advantageous to the infant.

Many obscure conditions exist in which intestinal intoxication and faulty metabolism of the food elements is diagnosed. Before a positive diagnosis can be made, if a luetic basis is suspected, a Wassermann or Noguchi reaction may be required.

The longitudinal sinus is also adapted for the abstraction of blood, as in venesection during convulsions. The relief afforded by this means is rapid and does not produce shock. Intracranial pressure can be relieved quickly, and this method of local depletion serves as well as a lumbar puncture. It is a most convenient place to give salvarsan injections. In septic diphtheria where rapidity of action is necessary to bring the antitoxin into the circulation, the sinus route is indicated.

In hemophilia, Peterson reports six transfused cases, one of these through the sinus route, with excellent results. As a hemostatic human blood acts in many instances rapidly—almost as a specific. In a hemophilic infant following circumcision, two ounces of blood injected into the sinus checked the hemorrhage within twenty minutes, although the infant had bled for four hours prior to this treatment. In another case of continued hemorrhage following an excision of cervical glands, postoperative treatment was unavailing until one ounce of human blood was injected by the sinus route.

Dextrose solution may be injected by this route. Sodium bicarbonate solution may also be injected in cases of acidosis. Normal saline solution and sterile serums may be injected during, or following, atrophic conditions due to enterocolitis. Such injections may be repeated once in twenty-four hours without producing shock. The first injection of 100 cubic centimeters may be followed by one of 150 cubic centimeters, and later 250 cubic centimeters may be injected every twenty-four hours until good stimulation is produced.

The shock incident to the exposure of a vein and the loss of time are factors which one must bear in mind when an easier, safer, and more rapid method offers itself. The risk of infection if one exposes the jugular, femoral, or median basilic vein must not be overlooked, especially in the weakened and puny infant.

Technique.—The infant should be wrapped in a mummy bandage, well pinned so that the arms and legs are confined, and placed flat on its back on a table. The head should be steadied on both sides by an assistant while the needle is inserted into the sinus. Anatomically the sinus does not vary. It grows wider toward the back of the head, hence we should always utilize a point as far posteriorly as possible. As the needle is pushed through the posterior angle of the fontanel it should be directed downward and backward in line with the sagittal suture. The landmarks are positive, and with but little practice we cannot fail to enter the sinus.

As the sinus lies very superficially we need not go deeper than 1 or 2 millimeters. For this purpose a needle one-half inch long of a 20 to 22 gauge, with a sharp point, is best adapted. For withdrawing blood a Luer or Record syringe should be attached. As the needle penetrates the sinus resistance is lessened, and we encounter the same sensation which we feel when the needle pierces the dura in doing a lumbar puncture.

We are now ready to aspirate sufficient blood for diagnostic purposes, or to transfuse the required quantity of blood or medication. As there is negative pressure within the sinus, before injection, it is better to withdraw blood, thus making sure we are actually in the sinus. The fluid is best given by gravity. A cylinder with a capacity of 30 to 100 cubic centimeters may be used. One end of a piece of rubber tubing is attached to the cylinder, and the other end has a connecting tip which fits into the needle. It is of advantage to have a stopcock either at the end of the cylinder or near the end of the tubing. The needle is inserted with a small syringe attached. By slight aspiration one can determine whether the sinus has been entered; if so, the syringe is detached, and the apparatus, which has been filled, and the air expelled, is connected. Air-pressure in the tube should be released by detaching the syringe before the needle is withdrawn.

[When dextrose is used the proportion is usually about 0.5 to 1 per cent.—Ed.]

EDITORIAL.

THE RELATIONSHIP BETWEEN THE WASSERMANN REACTION AND THERAPEUTIC EFFORT.

In a recent review of White and Martin's book upon Genito-Urinary Diseases we called attention to the statement, in the preface of that work, to the effect that the mere presence of a positive Wassermann reaction, in the absence of definite syphilitic manifestations, did not justify the physician, at least in every case, in instituting anti-syphilitic treatment. From the day when the Wassermann test was first brought before the profession until the present moment it has been evident that, like all other forms of human endeavor, it is liable to error in its technique and interpretation, and is capable, if depended upon too completely, of leading to disaster for both the physician and patient.

In the first place, it is possible that, through some error in technique, a negative report may be made when a positive report should have come to hand, and *vice versa*. It also happens not infrequently that a carefully made Wassermann test of the blood is negative, whereas the cerebrospinal fluid is positive, and, again, it has long been recognized that in the presence of a negative Wassermann test of the blood the administration of a so-called provocative dose of salvarsan will reverse the verdict. It has also been becoming increasingly evident that the Wassermann test is not infallible and that, like every other diagnostic factor in the study of a case, it must be taken for what it is worth and given its proper degree of value.

Many years ago, before the introduction of some of the present instruments of precision such as the blood-cell counting apparatus, the phonendoscope, various laboratory methods, and, last of all, the *x*-ray, the clinician had to depend upon his experience, his powers of keen observation and careful examination, and only succeeded if he trained his eye, his ear, his sense of touch, and even his sense of smell, to the highest possible degree of acuity. There can be little doubt that at the present time the younger members of the profession are too much inclined to let these forms of training lie fallow and to rely upon what they have been brought up to consider as more accurate laboratory methods. That the laboratory methods are, in the majority of instances, more accurate cannot be denied; that they should always be utilized is self-evident; but the point that we desire to make is that careful training of the clinical sense is as important as ever.

These facts are emphasized by an article by Symmers, Darlington and Bittman upon the "Value of the Wassermann Reaction as Indicated by Post-mortem Investigation in Three Hundred and Thirty-one Cases at the Bellevue Hospital, New York." From this article it is evident that what we have already stated in regard to reliance upon the Wassermann test holds true, namely, that it is one of the factors in reaching the diagnosis, but not the whole thing. These authors make a number of exceedingly wise deductions which are worth quoting. They say that in order to arrive at an intelligent interpretation of the result of the Wassermann test it is necessary to start with a conception of syphilis from an anatomic basis, and that all the signs of syphilitic infection, from the primary lesion to the scar which is left by the presence of the disease, are to be considered as a purposeful reaction to the injury, whereas the Wassermann reaction is not definitely specific, does not always occur in syphilis, does occur in conditions other than syphilis, and is a biological phenomenon in its nature and not anatomical. The Wassermann test should, therefore, be used to confirm the clinical diagnosis rather than to form a foundation from which other symptoms may be built up into definite form. Thus, before the Wassermann test was introduced the clinician looked for a genital scar, for pigmenta-

tion scars over the tibia with thickening of its periosteum, for enlarged lymph nodes, for thickening and atrophy at the base of the tongue with deformed cicatrices of the epiglottis, or perforation of the nasal septum. Now, all too frequently, the patient is referred to the laboratory, and the whole diagnosis and plan of treatment rests upon the report which is received.

Symmers, Darlington and Bittman tell us that, depending upon the antigen employed, the Wassermann reaction in the living subject gave them a negative result in from thirty-one to sixty-six per cent of cases in which the characteristic anatomical signs of syphilis were demonstrated at autopsy, and, again, they claim that the Wassermann reaction in the living patient is positive in at least thirty per cent of patients in whom, when the patient arrives at autopsy, it is impossible to demonstrate any of the anatomical lesions characteristic of syphilis. It behooves us, therefore, to remember that, valuable as it is, the Wassermann reaction should not be too thoroughly relied upon for diagnosis and treatment.

CAFFEINE AND GOUT.

It is known to most, if not all, of our readers that caffeine derived from coffee is not to be found on the market; all of the so-called caffeine being in reality theine derived from tea, and, indeed, the Pharmacopœia recognizes such theine and calls it caffeine. Whether there is any difference in the physiological action of theine and caffeine is, we think, a matter of dispute. Many years ago Mays published in the THERAPEUTIC GAZETTE a paper in which he thought he showed a very distinct difference. Be this as it may, whatever the profession knows in regard to the action of what they call caffeine is really based upon what they now regard as the effects of theine, and, so, a decision as to whether there is any difference between the effects of caffeine from coffee or theine from tea is, to some extent at least, an academic proposition.

A great part of humanity takes its education and information from the newspapers, either from their news items, or editorials, or their advertising pages, and one of the remarkable things about human beings of average intelligence is that they swallow bait, hook and line what they read, without stopping to inquire whether it is correct, accepting statements as gospel truth, even when it is very evident, if they stop to think, that the person who makes such statements has an axe to grind.

At the present time, for purely commercial reasons, a campaign is being waged to disseminate the idea that so-called caffeine is a toxic substance and that it should be avoided. It is claimed that its ingestion results in increased elimination of uric acid from the body, and it is intimated that caffeine is a deleterious substance, particularly so in those who have a gouty tendency.

It is not necessary for us to point out that uric acid as a toxic substance is no longer recognized. The old idea of uric acid as a factor in disease has been cast into outer darkness, for uric acid when pure when injected into the veins of an animal is not toxic. Therefore the ingestion of caffeine which results in increased elimination of uric acid does not indicate that the patient has been poisoned while the caffeine is passing through his body, and the very fact that when it is taken the quantity of uric acid passed by the kidneys is increased shows that it is rapidly eliminated and not retained. If those who are laying stress upon these facts, with the intention of making the laity believe that caffeine is poisonous, were attempting to encourage the use of some drug which by combination with uric acid would aid in its elimination, they would state that when their product was administered there was an increased amount of uric acid in the urine which would prove that their drug eliminated this substance, which, for the sake of their argument, they claim is toxic. In other words, the man who wants to sell a product which increases the elimination of uric acid claims that under its influence more uric acid appears in the urine, and the man who wants to

sell a product deprived of caffeine makes the same claim with a different deduction.

That caffeine, when taken in excess by certain individuals, may do harm is not to be denied, but the same claim can be made against common salt and even pure water. If caffeine taken in a beverage is as harmful as some persons would have us believe, the vast majority of the human race would come to an untimely end at a much earlier period than now occurs. There has never been a time in the history of the world when the duration of life was as great as at present, and it is a safe statement to make that there has never been a time in the history of the world when as many human beings were consuming beverages containing caffeine as at the present time. The vast majority of persons who drink coffee, tea, or caffeinated beverages find, as has been shown by Hollingworth, that caffeine acts as a lubricant to the mental processes, and that it, if proper food and rest is taken, enables the man who ingests it to accomplish an equal, or greater, amount of work with less friction and exhaustion than if the drug is not consumed.

It is of the utmost importance that members of the medical profession should get the correct conception in regard to matters of this kind. First, because, as educated medical men, it is their duty to be informed; and second, because there are few subjects about which patients so frequently consult them.

The whole question of caffeine and gout, we think, can be treated with levity. When caffeine, in any form, is used by an individual to spur him to greater effort, when he needs rest and food, it cannot be treated with levity. When it is taken in excessive quantity, as a matter of habit, the question of what is an excessive quantity for each individual must be considered. In these days of stress and strain, when it is inevitable that many human beings must be deprived of things which are comforting to them, we must have a wary eye upon those who, for various reasons, take the attitude, ascribed by Macaulay as to the Puritans in regard to bear baiting, to wit: that the Puritans did not object to the sufferings of the bear, but to the enjoyment of the spectators. In modern parlance, there are some people who believe that they have a mission, based on theory, identical with that of the Puritans, or they are desirous of promulgating the anticaffeine theory for purely business reasons.

ADRENALIN AND MUSCULAR BLOOD SUPPLY.

When adrenalin first appeared as a remedial agent it was shown to be possessed of such extraordinary powers that it attracted an immense amount of attention. Our constantly growing knowledge concerning it has not only confirmed early observations that it possessed great power, but has made it more and more apparent that its action varies considerably with the dose which is given, and with the method of administration. It is also becoming increasingly certain that its action on different parts of the body may be notably different. Thus, it is supposed to raise blood-pressure by stimulating the unstriped muscular fibers of the blood-vessels, and, on the other hand, to relieve spasmodic asthma by relaxation of the unstriped muscular fibers of the bronchioles. Again, it has been shown by Cannon and others that one of the functions of the adrenal secretion is to unlock, or set free, the store-houses of sugar in various portions of the body when the system is in need of an extra supply of nutriment. Or, to put it differently, when an animal or man calls upon his muscular system for a great output of energy an increased secretion of adrenalin takes place, which results in an increased quantity of sugar in the blood and so increases the nourishment of the muscles which are at work.

If adrenalin caused constriction of the entire vascular system it would diminish the blood supply to muscles undergoing exercise, and, so, while, on the one hand, it would supply more sugar for the nutrition of these muscles, it would indirectly diminish the supply of sugar to the constricted

blood-vessels. Recent researches have shown clearly that nature takes care that this does not occur. In the *American Journal of Physiology* for February, 1918, Gruber has shown that in animals, at least, small doses of adrenalin produced active dilatation of the blood-vessels in muscles, and he points out that these results coincide with those obtained by a number of other investigators. He believes that this effect is brought about by action upon the peripheral vasodilator mechanism, which, we believe, has been the opinion of most investigators, since it has not been thought that any effect was exercised through the vasomotor center.

These investigations are not only interesting in themselves, for the reasons that we have pointed out, but they are also interesting because they throw light upon the great complexity of the vascular action of the glands of internal secretion, and particularly of the adrenals.

It is becoming increasingly evident that the use of adrenalin does not produce a single effect, but is capable of producing many effects at wide variance with one another. It therefore behooves us to follow carefully all investigations which are made concerning this most extraordinary substance and to take care, in using it freely, that we do not do harm in one direction while we are endeavoring to do good in another. In other words, as we said in an editorial article which accompanied a series of reports upon the clinical use of adrenalin, which article appeared many years ago, it is inconceivable that a substance can be possessed of such extraordinary power for good without also being possessed, if it is wrongly employed, of power for harm. We do not mean to indicate by this that we regard adrenalin as a very toxic substance, nor one which, even when used in large doses, is capable of directly endangering the patient's life, but to emphasize the fact that the human mechanism is an exceedingly delicate one and that adrenalin is an exceedingly powerful agent in the influence which it can exercise upon different portions of the organism.

NEUROLOGICAL SURGERY.

Through that window of the central nervous system, to wit, the eye, the ophthalmologist has been peering with growing skill both in vision and interpretation, until now it forms perhaps the keystone of that diagnostic arch on which is being builded a sound surgical therapeusis. Moreover, there has come as a worthy team mate the neurologist with his more accurate knowledge of function, his more refined instruments for the detection of perversion or ablation, and his more complete and searching methods of examination; and this pair of worthies have at their beck the roentgenologist, who in his helpfulness, diagnostic and at times therapeutic, stands on an equal plane with both. Thus Kearney observes that if the vaginal space which surrounds the optic nerve as far as the globe is in normal communication with the intradural space, of which it is a continuation, any increase in tension of the cerebral and spinal fluid exerts a corresponding pressure upon the optic nerve sheath and its contents, and at times is sufficient to retard the normal outflow of the lymphatic and venous currents from the eye. As a result of this pressure, edematous changes are noted quite early in the fundus oculi. Should lumbar puncture be done when the changes are observed, there will usually be found an increase in the tension of the cerebrospinal fluid recorded by the spinal mercurial manometer.

If increased intracranial pressure is present, the edematous changes in the fundus of the eye occur in the following order and manner: First, the upper and lower margins of the optic disk, near the site where the blood-vessels penetrate, are slightly obscured; next the nasal or vascular half of the disk and its margins become blurred; after this the temporal half, and following this the edema of the entire disk increases until its height is measurable with an ophthalmoscope. When this measurement reaches 3 diopters it is called a choked disk. A papilledema is any measurable elevation of an edema confined to the disk; a choked disk is a papilledema of 3 diopters or more.

In optic neuritis the nerve head is only slightly swollen; the exudation obscuring its surface and margins is not confined to the disk, but extends to the surrounding retina as well, and is more correctly termed neuroretinitis. Choked disks have been observed in 80 per cent of the cases with brain tumor, and estimated with the ophthalmoscope they measure from 3 to 10 diopters in elevation. The at first red and juicy appearance is followed by densely opaque lines passing down the sides. Later they assume mound shapes, and their entire surfaces are densely opaque with linear hemorrhages into them, with swollen and tortuous veins, covered here and there with infiltrate. In the regressive stages the masses become pale, degeneration changes occur, and the end of the process is an atrophic nerve head.

From the standpoint of vision, a decompression is advised before the edema becomes densely opaque, because when this appears gross destructive changes have taken place in the nerve and the time is past when good vision may be assured. It is of great importance that a patient who complains of uncontrollable persistent headache should have a careful ophthalmoscopic examination made of the fundus of the eye. Seventy per cent of spastic palsies and 20 per cent of the resultant idiocy and feeblemindedness are due to intracranial hemorrhage at birth, the most damaging factor being the increase in the pressure of the cerebrospinal fluid as the result of the presence of the hemorrhage. In the fundus of the eye a general edema and blurring of all retinal and disk details, or a mild edematous blurring of the nasal half of the disk, or rarely a measurable edema occupying the entire surface of the disk, is found in these cases of intracranial bleeding. The diagnosis may be corroborated by lumbar puncture. It is the duty of the obstetrician who suspects a brain injury in an infant, after difficult delivery with or without instruments, to request an ophthalmoscopic examination to be made of the fundus of the infant's eyes as soon as possible after birth. In some cases a modified cranial decompression operation is surely indicated and is followed by good results. Kearney has examined 1400 children having spastic paralysis. He notes that 20 per cent have shown in the eye grounds the evidence of intracranial pressure. The examination of 212 cases, diagnosed as fracture of the skull, showed within twenty-four hours a general edema blurring equally all the details in the fundus of the eye. In the cases uncomplicated by an increase in the intracranial tension, the retinal edema gradually subsides. Any increase in intracerebral pressure will be shown by the spinal mercurial manometer, and indicates, first, repeated lumbar puncture, and later decompression.

Welton recognizes the signs of increased intracranial pressure by the *x*-ray pictures showing convolutional pressure atrophy of the vault, exaggeration of the markings of the vessels, and separation of the sutures in children. He states it is possible to differentiate tumors of the anterior fossæ, giving pressure signs from the condition of internal hydrocephalus by the absence of sella changes in the former condition. Pituitary tumor showed definite changes in the sella. It is possible to demonstrate acoustic tumors by the porus acusticus internus on the affected side. It is noted that fractures are much more frequent in head injuries than is commonly supposed, and it is implied that fractures of the base are not always detected.

Lott observes that during the past two years he has performed lumbar puncture upon nearly all of the patients admitted to Sharpe's service at the Polyclinic Hospital. He advises frequent drainage of cerebrospinal fluid in selected cases in acute wet edematous conditions of the brain resulting from intracranial hemorrhage, chorea, delirium tremens, uremic coma, convulsions in epilepsy, encephalomyelitis; also for petit mal; and states that in every case in which the patient is unconscious or paralyzed and the cause is not known a lumbar puncture should be performed as an aid in differential diagnosis.

The contributions to neurological surgery cited above and purporting to represent the latest and best are lacking in that careful,

systematic, and convincing study to be found in Cushing's recently published work on Acoustic Tumors. Decompression has surely its indications and uses; the former distinctly lie in its performance on the early signs of an increasing intracranial pressure. Without symptoms puncture for diagnostic reasons is neither desirable nor safe, unless the diagnosis desired is an index to a definite treatment. Moreover, in so far as determining whether the brain has or has not been injured it is fallacious.

TUMORS OF THE BREAST.

Under this title the surgeon of a generation ago would expect to find described such massive growths as constitute obvious deformities, which by their infiltration or ulceration produce crippling pain or exhausting discharge and bleeding; since in another day the patients with breast tumors were never referred to the operator until they had reached their almost ultimate stage. Nor in the case of malignant growths was the operation of any particular service, excepting perhaps to add to the comfort of the patient and in some cases at least to prolong life.

To the present-day surgeon there are presented a multitude of growths, often so small as to escape any but the most minute examination; at times perceptible only to the patient herself; at times representing only the induration of the normal involution of age.

In the *New York State Journal of Medicine* for April, 1918, there are presented a number of papers bearing upon this subject, the first by Syms on both the Surgical Histology and Anatomy of the Breast. Syms has shown that breast tissue can be found far beyond the limits to which the organ was formerly supposed to be confined. In cancer there is an invasion of the lymphatic spaces particularly in the direction of the connective tissue processes radiating from the tumor into the surrounding region and its environing fat. In the ligaments of Cooper the cancer cells reach the corium; they extend into the retromammary tissue and pectoral fascia.

There is also a communication between the lymphatics of the two breasts through a median anastomosis of both the superficial and of the retromammary lymphatics. The main lymphatic trunks of the axilla run for the most part along the blood-vessels.

The various sets of lymphatic vessels of the breast communicate freely one with another. The efferent lymphatics of the entire gland with its surrounding fat open either directly or indirectly into the lymphatics of the deep fasciæ, which latter accompany the blood-vessels of the gland, and are rich in lymphatic nodes, which lie in a group or chain alongside of them. The lymphatics in the inner side of the breast accompany the perforating branches of the internal mammary artery to join the sternal glands placed along its trunk. The greater number, however, accompany the mammary branches of the acromiothoracic, the long thoracic, and the external mammary branches of the axillary artery to open into the axillary glands.

MacCarty describes flattened cells which lie between the secreting cells of the ducts and acini and the basement membrane. These cells he believes are undifferentiated epithelial cells analogous to the basal cells of the skin. Under certain conditions they undergo hyperplasia, displacing and replacing the true epithelial cells of the gland; when they break through the basement membrane becoming cancer cells. In the normal acinus these cells, which he calls germinal, are small and few. In chronic mastitis they increase in size, crowding but not destroying the true secreting cell. In the further stage, due to irritation, these cells entirely displace the differentiated or secreting cells, and ultimately, by proliferating widely through the base membrane, become the cancer cells.

Deaver notes that there are two principal forms of subnormal involution—one, the ectactic or cystic, in which epithelial hyperplasia is the minor factor; the other, the proliferative, adenomatous, or adenocystic variety, in which epithelial activities con-

stitute the important feature in the microscopic picture. Cyst formation, however, occurs in both forms. In the proliferative type the increased epithelium behaves in one of several ways, which may be classified, as Warren suggests, in the following manner: Proliferation of acini—an apparent increase in the number of acini in each lobule. Papillary outgrowth of epithelium into cystic spaces, the papillæ lacking a connective tissue pedicle or support. Papillary outgrowths of epithelium into cystic spaces of such complexity that the cyst cavities are almost or may be completely filled by the hyperplastic epithelium. Microscopic examinations of sections of this variety of abnormal involution resemble glandular tissue, hence the term adenomatous, or adenocystic. This change is of vital interest to the surgeon because it is chiefly in its presence that the combination of abnormal involution and carcinoma is observed.

The cystic and adenomatous varieties of the disease commonly occur in the same breast; in fact, in different portions of one diseased area of the breast. Again, it is impossible to differentiate clinically the relatively innocuous areas from those that may be predestined to malignant transformation. Finally, the preoperative determination of incipient or, in some cases, even of relatively far-advanced malignancy, is impossible. Let us clearly understand that the terms early and late as applied to malignant disease refer solely to the distance to which the malignant cells have wandered from the primary growth. These terms have no practical significance when used in reference to the actual time, which we are erroneously led to believe from the history of the patient or from the results of physical examination, that the disease has existed. From the foregoing remarks it would seem easy to determine the presence of abnormal involution, or at least of some disease other than cancer, in the breast. Were it not for the fact that cancer is believed to originate from or to coexist with abnormal involution, and that other areas of the breast are known to become involved after removal of abnormally involuted areas in some cases, our dilemma would be less acute.

Localized areas of the disease could then be excised with safety and wide-spread involvement of the breast would merely demand conservative amputation; or, in the absence of subjective symptoms, the patient could safely be treated palliatively. The surgery of this disease is founded, therefore, on our knowledge of its malignant tendencies or associations. There are good reasons for this. Among the 335 operative specimens of carcinoma that furnished the material for pathological studies, McFarland found 23 (6.8 per cent) instances of such association. Warren states that fifteen of his 517 cases of cancer of the breast were associated with abnormal involution. It is believed by most authorities that about 10 per cent of the adenomatous variety of abnormal involution will develop cancer, while Bloodgood has found that in about 50 per cent of cases with marked adenocystic changes cancer is already present at the time of operation. Many pathological investigations have shown chronic mastitis or abnormal involution to be in almost constant association with carcinoma of the breast. It should not be forgotten, however, that the adenomatous variety of abnormal involution is rare, in comparison with the cystic or benign type.

Another and probably more fruitful source of data valuable to the surgeon is the study of end results in the cases of abnormal involution treated conservatively. Deaver's figures throw little light on this subject, but Bloodgood reports 100 cases in which the breasts were explored and cysts of simple character, and sometimes suspicious character, removed. The cysts were reported to contain clear fluid, and their walls were free of papillary excrescences. Sometimes the walls were indurated, and upon microscopic examination some of these indurations showed carcinoma-like structures. Nothing was done except to excise the cysts and surrounding tissue, yet recovery took place without the subsequent development of cancer.

In a series of eighty-three cases of cys-

tic disease of the breast, most of which were treated conservatively, Greenough and Simmons report that by partial operation 80 per cent were apparently cured—that is, free from recurrence—for a period ranging from one to seventeen years. Thirteen cases (15.6 per cent) showed, sooner or later, a return of the disease. Recurrences of the cystic disease or of carcinoma occurred in twelve of the eighty-three cases, while a total of sixteen (19 per cent) failed to get permanent relief from the partial operation. This would seem to justify a more conservative attitude regarding the disease than evidently exists, judging from the experience of McFarland, to whose laboratory forty-five breasts were submitted by surgeons for examination. Of these "only four showed mild adenocystic change, and only seven epithelial proliferation into cystic spaces; while thirty-four were entirely benign cases of normal or senile involution." If it be true that the breasts of 25 per cent of all middle-aged or older women that come to the post-mortem or dissecting table show areas identical in structure with those for which many operators are doing radical amputation, the inevitable conclusion follows that the danger of abnormal involution is overemphasized, and that there is a fear among surgeons of the future development of malignant disease that lacks the support of surgical knowledge and experience.

Cysts of the breast are commonly a part of the disease which the author prefers to call abnormal involution, or they may arise in either benign or malignant tumors. There is, however, a small group of cases in which cysts develop independently of any demonstrable cause or lesions. These are called simple or serous cysts, but it is Deaver's belief that the majority of them represent a type of abnormal involution in which the development of one large cyst overshadows the true nature of the underlying disease.

They appear as lumps of varying size, rounded in outline, sometimes nodular, but more often smooth, soft, and fluctuating. Pain is a frequent symptom. Malignant attributes are wanting, and when the cysts are large and superficial the diagnosis is made with ease. Aspiration for diagnostic purpose is of little or no value. The differentiation between benignancy and malignancy cannot be made from the nature of the contents of the cysts, and since treatment is founded on their differentiation the decision as to the best procedure must be made when the cyst is exposed.

This also applies to the mammary duct papillomata, the tumor disease known as intracystic papilloma, in which papillomata spring from the lining membrane of the milk ducts and later cause cystic distention of the ducts themselves.

In some instances the papilloma is small and the cyst large; in other instances the papilloma entirely fills the cyst, which then gives the impression of being a solid tumor. These tumors are usually situated beneath or in the region of the areola with their long axis in the line of the milk ducts. Bleeding from the nipple is a prominent symptom in 50 per cent of cases. The malignant potentialities of these tumors are marked and should be borne in mind when operation is undertaken.

Practically all indigenous tumors of the breast are composed of both connective and epithelial tissues, but the term fibroepithelial, as used in current nomenclature, denotes a group of benign growths, the individual members of which have heretofore been named after the proportionate amount of their constituent cells. Some terms previously used were descriptive of their gross structure, such as fibrocystic adenoma, etc. These tumors are capable of growing to enormous proportions and are subject to various pathological metamorphoses. The surgeon, however, meets with them as single or multiple, walnut to egg-sized, rounded, discrete, freely movable, only moderately dense nodules. Their percentage incidence is greatest in young women. Fibroepithelial tumors of the breast, as a class, rarely undergo malignant transformation. There is, however, no question but that sarcomata of the periductal variety originate from their stroma, usually as the result of trauma. For this reason the term complicating sar-

coma is particularly appropriate. This danger in itself would scarcely warrant operation, however, since it is a rare complication, but the diagnostic uncertainty that attaches to every tumor of the breast, the consciousness of its presence, and the apprehension thereby created justify the removal of the neoplasm. This is carried out on conservative lines until examination of the exposed tumor determines the further course of procedure.

What are the chances of permanent operative cure? That is, will the tumor recur after operation? Is the operation safe and not disfiguring? Will the other breast subsequently become diseased?

In answering these questions the author presents his operative experience in 300 or more cases of benign diseases of the breast. The postoperative histories of 130 of this series are known to him. One of these died of pneumonia after leaving the hospital; the remaining 129 are living, but not all of them are well. Of the 70 patients with fibroepithelial tumors, 17 (24.3 per cent) have returned for a second operation, or have written the author that they have had further trouble with their breasts. Six have recurrences in the same breast, seven have had tumors develop in the opposite breast, one has had a recurrence, no doubt malignant, in the glands of the neck, one developed a tumor in the opposite axilla, one had the breast amputated subsequently for abnormal involution, and another was operated upon for painful scar.

A summary of the author's experience in the surgery of benign mammary disease warrants conclusions on the side of conservative methods of treatment, but in doubtful cases no treatment should be considered complete in the absence of a microscopic diagnosis.

In the absence of laboratory diagnostic measures it is better to invite errors on the side of radicalism. The prognosis of carcinoma is best in direct ratio with the difficulties of clinical diagnosis, provided the proper technique be followed at the operating table. The greater the subjective symptoms in a neoplasm of the breast the better are the chances of its being benign. Women who have had benign neoplasms of the breast removed should be examined at regular periods of time for the possible reappearance of the tumor or for beginning malignancy. Ideal results in border-line cases, by which is meant the performance of radical operations in the presence of beginning carcinoma, and the avoidance of unnecessary mutilation in benign cases, demand diagnostic aids other than those of the hand and eye of the operator; the court of last appeal must always be the laboratory.

REPORTS ON THERAPEUTIC PROGRESS.

QUININE IN THE TREATMENT AND PREVENTION OF MALARIA.

The *Lancet* of February 23, 1918, tells us that recognizing that there are few questions on which opinion is so varied, the War Office early in 1917, when arranging for the concentration of malaria cases returned from overseas in special hospitals in England, where they might be treated by specially qualified officers, decided to invite those officers to coöperate in a scheme for comparison of the practical results obtained from different lines of treatment. The outcome has been a very valuable series of reports from hospitals at Aldershot, London, Epsom, Oxford, and elsewhere, which were summarized by Sir Ronald Ross, an adviser of the War Office in these matters, in a paper read to the Society of Tropical Medicine. The treatments adopted were classified into (*a*) "antirelapse quinine prophylaxis," which was designed for preventing relapses as much as possible without attempting absolute and immediate cure; (*b*) "short sterilizing," which attempted absolute cure with treatments ordinarily continued only for a few days; (*c*) "long sterilizing," aiming at producing

absolute cure by longer courses than those given in (*b*); and (*d*) mixed treatments, and treatments with drugs other than quinine. The criterion of success was the disappearance of relapses during the observation periods practicable; nearly all the cases were of malaria (mostly benign tertian) which was already of considerable duration, and only a very few cases were original infections.

The treatment in each of the classes stated above comprised different salts and preparations of quinine, administered by the mouth, and by subcutaneous, intramuscular, and intravenous injection, in different doses and for different periods, to larger or smaller groups of patients. The result from all the quinine treatments taken together was represented by some 27 per cent of ascertained relapsing cases in a total of about 2500 patients. At Oxford a control was offered by 192 men who were watched without any quinine treatment at all, and of these 89 relapsed within 27 days, and 76 were presently judged not to be sufficiently well to allow quinine treatment being withheld any longer; so that 86 per cent of the untreated cases remained ill and 46.5 per cent actually suffered from relapses during the period.

As regards the different methods and doses the actual figures given by Sir Ronald Ross are not quoted. It was stated that considerable additions can now be made to them, and the discussion by the Society of Tropical Medicine should bring out comments on the sufficiency of the numbers of patients in the several groups and on the advantages to be claimed for one or another group of results. The data supplied, however, appears to establish the fact that short intensive treatment by large doses of quinine (for example, up to 180 grains of sulphate or hydrochloride in three days) can, with rest, stimulants, and good after-treatment, be very well borne by the patient, and effect a substantial proportion of cures. The same can be said for doses in class (*c*), which in some instances totaled over 1000 grains in four weeks, large intramuscular doses being given during the first days of the period. But however the doses were given in classes (*b*) and (*c*), the liability to relapse in patients receiving the treatment was not any less than in cases treated much less heroically under the method of class (*a*), by giving comparatively small doses amounting to about 60 grains a week. It was concluded that doses of this order gave the best results both in respect of the prevention of relapses and as regards the well-being of the patient, and that this dosage could be distributed in various ways without producing any marked difference. The amount should not, however, be less than a daily dose of about 10 grains, as this showed a marked superiority over smaller quantities.

As a whole, the observers found no conspicuous advantage in any one of the three methods of administration of quinine, intramuscular, or intravenous, or by the mouth. Chemical examinations of urine point to a tendency for the excretion of quinine, in whatever doses given, to reach a concentration of 7 to 11 grains per liter of urine, and do not favor the view that the drug is eliminated with a different degree of readiness when given by the mouth than when given by other methods.

These results, if they have failed to bring out any sensational short-cuts to the cure of malaria, give confidence in methods usually and conveniently employed, and enable the dosage for general use in the army to be recommended on a substantial basis of recent differential experiment. The evidence that continued daily doses of only five grains afford a relatively slight protection against relapse is important and no doubt accounts for much of the disappointment which has been expressed at the results of the prophylactic use of quinine in this dosage in the malarious areas of Macedonia, where relapses are so common among a large proportion of the force which has become infected. Many now go further and hold that this practice has been proved useless in the Eastern war areas as a preventive of malaria, not merely in the matter

of cutting short relapse but in the prevention of first or new infections; under this view it must be accepted that a man who has just been bitten by an infected anopheline cannot count on obtaining any protection from quinine in such doses, even when they are taken immediately after or within a few hours of the bite. It is urged, moreover, that the continued dosage of prophylactic quinine may do harm by lowering the response to the drug when actual attack occurs.

This matter is of much practical importance. Official instructions that antimalarial measures in districts specially affected should include prophylactic daily 5-grain doses of quinine have had behind them a measure of experience and authority much too great to be disregarded, and the medical authorities of the army would rightly have been held to have failed in their duty if they had not made provision for the supply of quinine for the purpose, and had not pressed its use in those malarious regions where the circumstances of the campaign prevent effective measures being taken to ward off mosquito-bite. If the view is now to prevail that the failure of the prophylactic use of quinine under war conditions has been demonstrated, we hope that the causes of the failure and the nature of the proof will be fully analyzed and discussed.

To decide the question of general orders in the matter, it might be enough to show that after prolonged trial in practice the results have not been sufficiently good to make insistence on systematic quinine prophylaxis worth while; this would mean to disregard the question whether the cause of failure was inherent in the drug and the habits of the malaria parasite, or was to be found in the practical impossibility of giving the attention to regularity of administration, hours of dosage, and other details which the system requires. But an authoritative answer would still need to be given to the individual soldier going out for the first time to a malarious area during the bad season, who is prepared to observe instructions and to take drugs as and when he is advised. He requires to know whether he should or should not take daily quinine to ward off a first infection, and, if so, what amounts he should take. We hope that this aspect of the matter will not be lost sight of in the further discussion arranged for.

THE STETHOSCOPE AS AN AID IN THE EARLY DIAGNOSIS OF GAS GANGRENE.

In the *Journal of the Royal Army Medical Corps* for January, 1918, MAYBURY states that many wounds exhibit a varying degree of swelling of the surrounding parts within twenty-four hours of their infliction. In a certain proportion of these cases, especially if the wounds are not drained, the swelling increases and the part becomes infected with gaseous cellulitis, which is recognized clinically by well-known signs, *e.g.*, resonant muscle, characteristic odor, etc. In the remainder, gaseous cellulitis does not develop and the swelling gradually subsides under ordinary treatment.

Crepitations can be detected by auscultation with a stethoscope of the portion of a limb infected with gaseous cellulitis. While this sign is present in a well-established case with "drummy muscles," its importance lies in the fact that it is present in a number of cases before the muscles become resonant to percussion, and it is therefore useful in distinguishing between the first group of cases mentioned above and the second.

The sign is produced by placing the stethoscope on the swollen part and then alternately increasing and decreasing the amount of pressure to the chest-piece; this produces the necessary movement of the underlying muscle. Another method is to press the swollen part in several places with the finger, while the chest-piece is firmly placed on the center of the swollen area.

The crepitations thus produced vary in intensity and in number. In the early cases they resemble those heard in the lungs affected with chronic tubercle and may be few in number; in the later cases they are much more numerous. In cases in which

subcutaneous gas is present, they are much louder and are similar to those heard in ordinary subcutaneous surgical emphysema.

The crepitations may disappear temporarily from a given area, if that area has been manipulated for a short time.

Care should be taken to avoid mistaking the sounds produced by gas from those due to the presence of blood-clot and from those due to friction between the skin or hair and the stethoscope.

The detection of these audible crepitations may be of use in two ways: (1) In cases in which they are present the wound should be more freely opened up than would otherwise be done, and if necessary secondary incisions with free transverse division of the deep fascia should be made into the muscle over which the crepitations have been heard. (2) During active operations, when owing to the large number of cases admitted to the clearing stations it is impossible to drain all wounds involving muscular tissue, cases in which crepitations are present should have preference as regards operation over those in which they are absent.

ENCOURAGING THE PARALYTIC TO RECOVER.

The *Medical Record* of March 9, 1918, states that we are all aware of the possibilities of reëducation in compensating for loss of tissue. Such surprising results have been obtained both experimentally, where first one motor area and then both were excised in monkeys' brains, and practically, where paralytics of the sort usually termed chronic and hopeless have been restored to comparative health, that we look upon even the least promising case with a fair degree of optimism. The secret of the method lies in keeping everlastingly at it, working with the patient every day, and setting the mark of progress a little farther ahead all the time. One point, however, is entitled to special comment, and that is the matter of enlisting to the utmost the patient's aid.

So often in these cases have we to do with a temperamental laziness or indifference or pessimism, or else an apathy closely associated with and perhaps caused by the actual damage done to psychic centers by the cerebral lesion responsible for the paralysis, that we are apt to be discouraged at finding our efforts nullified to some extent by the *vis inertiæ* of the patient. In such cases there are three ways of getting coöperation: holding out the prospect of recovery, making the exercises interesting, and representing progress graphically.

The first method it is probably unnecessary to emphasize, as it is such an integral part of the practitioner's armamentarium. The second method is one whose importance should never be underestimated. All of us who have at various times in the past decided that our biceps needed hardening, or our chest expanding, and to that end have purchased wall-exercisers or dumbbells, with the praiseworthy intention of devoting fifteen minutes a day to them, know how difficult it is to keep such a resolution. Likewise, the patient, if put at doing exercises over and over of whose rationale he is unaware and the effects of which he cannot see, is apt to grow extremely bored with them, and either neglect them altogether or slight them fearfully. On the other hand, by utilizing the "play spirit" we can be assured of his unflagging devotion to the business in hand. Even so simple a game as trying to pitch a tennis ball into a basket several yards off, and registering the number of successes, will rouse interest; or casting a dart at a target; anything, in short, which permits of a score being kept will rouse the patient to efforts to "beat his own record."

Finally, the recording of the patient's progress by means of charts is helpful. The more striking these are the better. Big black and red lines, showing decided upward sweeps, are good. If the patient is able to pick up a tennis ball with the paralyzed hand in 40 seconds the first day, for example, and 38 the second, and 30 the third, this progress should be represented by a curve going upward, and the patient

will soon feel eager interest in it, and try each day to force it higher.

The ingenious physician will thus find many ways of stimulating the patient's interest, and be rewarded by finding that his paralytic patients make remarkable progress on the road to recovery, and that he does not have to be constantly urging them to persist in their exercises.

A CONTRIBUTION TO THE PROPHYLAXIS OF LOBAR PNEUMONIA.

In the *Journal of Infectious Diseases* for March, 1918, KOLMER and STEINFIELD reiterate their confidence in hydrocuprein hydrochloride as a prophylactic for pneumonia.

Bearing in mind the numerous difficulties in disinfecting the mouth of pneumococci even with powerful and more or less specific antipneumococcus agencies, as ethylhydrocuprein and other quinine compounds, it is hardly to be expected that complete destruction of all pneumococci in the mouth and upper air-passages generally can be accomplished by this means, but for use among physicians, nurses, and members of the family in intimate contact with persons suffering with lobar pneumonia the systematic and daily use of washes prepared from 1:10,000 solutions of ethylhydrocuprein hydrochloride or quinine bisulphate in 1:1500 solution of thymol *may serve to destroy virulent pneumococci as they gain access to the mucous membrane of the mouth and upper part of the throat and prevent their proliferation in large numbers;* in this manner and among such groups the systematic use of a mouth-wash of this kind held in the mouth and gargled in the throat for at least a minute twice or three times each day may aid in the prophylaxis of lobar pneumonia. Ethylhydrocuprein hydrochloride by reason of its superior pneumococcicidal properties is to be preferred, but owing to the great scarcity of the drug at this time may be substituted by quinine bisulphate; solutions of either stronger than 1:10,000 are likely to prove objectionable to most persons. Thymol in itself appears to aid in the disinfecting process and is well borne in a 1:1500 dilution, serving also to disguise to a large extent the bitter taste of ethylhydrocuprein or other cinchonic.

Experiments *in vitro* have shown the high pneumococcicidal activity of varying dilutions of ethylhydrocuprein hydrochloride, quinine bisulphate, and other cinchona compounds in thymol solution, for Type I and Type IV pneumococci in the sputum of convalescents from lobar pneumonia and the mouth secretions of normal persons.

As recent investigations in the epidemiology of lobar pneumonia have indicated that the disease is frequently acquired by transmission of specific virulent types of pneumococci from a recovered person who still harbors in the mouth secretions the organisms responsible for the disease, or from a healthy carrier of pathogenic pneumococci, it is suggested that the systematic use by the patient and those in close contact with the disease of a mouth-wash of 1:10,000 solution of ethylhydrocuprein hydrochloride or quinine bisulphate in 1:1500 solution of thymol may serve to destroy or inhibit the multiplication of the disease-producing pneumococci and thereby aid in the prophylaxis of lobar pneumonia.

THE PREVENTIVE TREATMENT OF WOUND SHOCK.

To the *Journal of the American Medical Association* of March 2, 1918, CANNON, FRASER and COWELL contribute a paper on this subject.

The low blood-pressure of shock has been met hitherto by the injection of normal or hypertonic salt solution, or by combinations of salt solution and gum. There is no doubt that in some cases such injections have had definitely beneficial effects. Part of the pathology of shock is due to a loss of fluid from the circulation and consequent concentration of the blood. The injection of salt solution adds fluid to the body and improves the circulation, so that the con-

centration is soon abolished, and the viscosity of the stagnant blood lessened. In such cases, however, the degree of acidosis had not been determined, and injection of physiologic sodium chloride solution or Ringer's solution makes no provision against such critical turns as have been encountered during operation or shortly thereafter in consequence of increased acidosis. Not only does ordinary salt solution fail to combat acidosis; it actually *increases* an already existent acidosis. Milroy has recently shown that hemorrhage results in a loss of reserve alkali, and that then injection of sodium chloride solution alone causes a *greater* H-ion concentration of the blood exposed to a given pressure of carbon dioxide than was present before the injection.

What is wanted is a fluid that will have the advantages already demonstrated for salt solutions—thinning of concentrated blood, lessening of viscosity, and increase of blood-flow with restoration of arterial pressure together with antagonism to the state of acidosis. Such a fluid is found in sodium bicarbonate solution. Howell observed years ago that alkaline injection (sodium bicarbonate) into a vein or into the rectum raised a systolic pressure of 60 or 70 mm. permanently to the normal level, and caused a marked increase in the force of the heart-beats. If the pressure was lower (from 20 to 30 mm.) it was raised to 60 or 70 mm. Also the effects were relatively permanent, lasting one or more hours. These observations were confirmed by Dawson. Either intravenous or intrarectal injections of sodium bicarbonate can restore the alkali reserve and abolish an existent acidosis.

Injection of a fluid that will increase blood-pressure has danger in itself. Hemorrhage in a case of shock may not have occurred to a marked degree because blood-pressure has been too low and the flow too scant to overcome the obstacle offered by a clot. If the pressure is raised before the surgeon is ready to check any bleeding that may take place, blood that is sorely needed may be lost. Fortunately, the injection may be made at the start of operation, just after the patient has been prepared and when the surgeon is ready to stop any hemorrhage, and it may continue as the operation proceeds.

The fluid that was injected in the cases recorded was a 4-per-cent solution of sodium bicarbonate. Since 1.5 per cent sodium bicarbonate is approximately isotonic with the blood plasma, the 4-per-cent solution is rather strongly hypertonic. It had previously been employed, however, in treating cases of diabetic coma, and if introduced slowly (at the rate of an ounce a minute) it causes no noteworthy alteration of the blood. The fluid should, of course, be delivered to the body at approximately body temperature—it may be a few degrees warmer, but should not be colder, than that. If the solution is passed through a tube of considerable length before it enters the vein, it should have a temperature maintained between 110° and 115° F.

The boiling of sodium bicarbonate in solution changes it to sodium carbonate. Since the bicarbonate should be injected, it should not be boiled. The solution should be made just before it is used, by the addition to warm sterile water of the proper amount of the sterile salt.

To inject the solution it is usually not necessary to lay bare a vein and introduce a cannula. If a small rubber tube is drawn around the upper arm as a tourniquet and held by a looped twist (not so tightly as to obstruct the arterial flow, which, it will be noted, has a low pressure), the veins at the elbow will in most cases become sufficiently prominent to permit a hollow needle to be introduced into one of them. The lumen of the needle should be large enough to permit a pint of the bicarbonate solution to pass in fifteen or twenty minutes when the head of pressure is only 2 or 3 feet. A glass reservoir marked in ounces permits a judgment as to the proper rate of flow. As soon as the needle enters the vein, an outflow of blood through the lumen gives evidence. When the blood thus appears, the tourniquet should be pulled loose, the

rubber tubing full of the solution should be connected with the needle, and the flow allowed to start. In some few cases the veins are so obscure as to make this procedure difficult or impossible; in that case the needle or small cannula must be inserted into the bared vessel.

An ideal injection fluid for shock cases would be a solution with colloid added, as Bayliss (Proc. Roy. Soc., 1916, 89, 380) has suggested—for example, one containing sodium bicarbonate in proper amount and 6-per-cent gum acacia (see further Bayliss: Injections to Replace Blood, Memorandum 1, of Reports of the Special Investigation Committee on Surgical Shock and Allied Conditions, Nov. 25, 1917). Unfortunately, the gum contains calcium, which precipitates as calcium carbonate as sodium bicarbonate is added. If this precipitate is filtered out, the solution has the advantages of being both alkaline and viscous. The Medical Research Committee is preparing to provide in bottles sterile solutions of 6-per-cent gum, to which 2-per-cent sodium bicarbonate has been added, and the deposit filtered out.

THE ROLE OF CARBOHYDRATES IN INFANT FEEDING.

Wilson in the *Southern Medical Journal* for March, 1918, makes these remarks:

First, granting that one had the proper appreciation of the dangers and difficulties of fat, the adaptation and dosage of the carbohydrate is the determining factor in finding the proper food. Certainly, carbohydrate is the only element we can qualitatively modify.

Second, normal babies can take with equal benefit either of the three forms of sugar. Lactose seems possibly to suit very young babies better. Cane-sugar suits older babies as well as any form. Malt sugar is indicated when others fail to produce a sufficient gain, or when malassimilation of fat is evident.

Third, the adjustment of the carbohydrate to a difficult feeder is an individual proposition, differing with each case.

Fourth, starch waters are valuable chiefly through their colloidal action. Any attempt to give enough to displace sugar is disastrous.

Finally, if a baby had the same trouble taking care of sugar that Wilson says he has had trying to assimilate the confusing, contradictory, indigestible literature on this subject, he is sure the baby would cut it out altogether.

THE TREATMENT OF THE ACUTE DIARRHEAL DISEASES OF INFANCY.

In the *Southern Medical Journal* for March, 1918, Morse tells us that when the diarrhea is due to an excessive amount of, or too rich, breast-milk, the stools are usually normal in color, but contain many fat curds and more or less mucus. The remedy, when the cause is too much breast-milk, is to shorten the duration of the nursings. The failure to empty the breasts will quickly diminish the supply of milk. When the breast-milk is too rich, the intervals between the nursings should be lengthened, as this procedure tends to diminish the amount of solids in the milk. The duration of the nursings should be shortened and water given at the time of the nursing to dilute the milk. A more simple diet and more exercise for the mother will usually bring down the strength of the milk to within normal limits.

There is nothing characteristic about the stools when the diarrhea is due to an excessive amount of or too rich an artificial food. They may show evidences of the disturbance of the digestion of any or all of the food elements. Evidences of the disturbance of the digestion of fat are the most common. In beginning the treatment the intestines should be emptied with castor oil or milk of magnesia and all food stopped for from twelve to twenty-four hours. The baby should then be given small amounts of a dilute food for a time, after which the amount and strength of the food should be gradually raised to the baby's capacity.

Diarrhea from an excessive amount of

fat in breast-milk is comparatively uncommon and the symptoms are usually not severe. The stools are nearly normal in color. They contain many small, soft curds and often mucus. Sometimes they have an oily appearance. They are more acid than normal and often cause irritation of the buttocks. It is usually not necessary to give a cathartic or to starve the baby. The duration of the nursings should be shortened temporarily and water given at the time of the nursings. Cutting down the amount of the mother's food as a whole, increasing the amount of exercise which she takes, and getting her out-of-doors more will usually promptly bring down the percentage of fat to within normal limits.

Diarrhea from an excess of fat in an artificial food is not at all uncommon. When the disturbance is a mild one the stools are not much changed in color, but contain many small, soft curds and some mucus, and are sometimes more acid in odor and reaction than usual. Sometimes they are gray and shiny, and in other instances, when there is an excess of neutral fat, they are creamy in consistency and color. Sometimes they look like curdled milk. In other instances they are bright-yellow and have an oily appearance. They are seldom green, unless there is also a disturbance in the digestion of sugar. In the worst cases they are watery, strongly acid, and cause marked irritation of the buttocks. When this happens, the fat is in combination with the alkaline salts, especially sodium. As the result there is a considerable loss of alkaline salts in the stools. A relative acidosis is thus produced, with an excess of ammonia in the urine. The symptoms of acid intoxication may then develop. A high fever is not uncommon in these severe cases. The prognosis depends upon the severity of the symptoms, but is, in general, good, unless there is a marked acid intoxication.

The treatment consists in the complete elimination of fat from the food. It is not enough to diminish it; it must be cut out entirely. In some instances it is advisable to give a cathartic in the beginning and to starve for from twelve to twenty-four hours. In the cases with acid intoxication, bicarbonate of soda should be given in some way and a food containing considerable amounts of sugar, preferably in the form of glucose or maltose. In the less severe cases protein is usually well tolerated and the caloric value of the food, which is much reduced by the withdrawal of the fat, can be made up by increasing the amount of carbohydrates. Fat can usually be cautiously added again in a few days. How rapidly it can be added can only be determined by observation of the symptoms and examination of the stools.

Diarrhea from an excessive amount of sugar in breast-milk is very uncommon, and when it occurs is almost never very severe. The stools are loose, light-green in color, acid in odor and reaction, and irritating to the buttocks. If the mother has been taking a very large amount of sugar, cutting it down will probably reduce the percentage of sugar in her milk. If she has not, the only way to reduce the amount of sugar in her milk is by cutting down her food as a whole and making her exercise and get out-of-doors more.

Diarrhea from an excess of carbohydrates in an artificial food may be caused by an excessive amount of any of the different forms of sugar or of starch. The symptoms vary somewhat, according to which of the carbohydrates is the cause of the trouble. In general, the acute diarrheas from milk-sugar and cane-sugar are more serious and carry a more grave prognosis than do those from the maltose-dextrine preparations and starch. In most instances it is probable that the symptoms are in part due to the products of the fermentation of the carbohydrate at fault as the result of bacterial action. That is, the line between diarrhea from the disturbance of the digestion of carbohydrates and diarrhea with fermentation is very indefinite. A rise in temperature, sometimes considerable, is not uncommon, and is likely to be most marked when the trouble is due to milk-sugar or cane-sugar.

When the diarrhea is due to an excess of

milk-sugar or cane-sugar the stools are loose or watery, green, sour in odor, acid in reaction, and irritating to the buttocks. They often contain some mucus and not infrequently fat curds, the latter being due to the interference with absorption as the result of the speed with which the intestinal contents are carried through the bowels. The bowels should be cleaned out at once and food stopped for from twelve to twenty-four hours. All sugar should then be eliminated, as far as possible, from the food. Whey and whey mixtures are contraindicated, because whey contains from 4.50 to 5 per cent of milk-sugar. Human milk is also contraindicated on account of the large amount of sugar which it contains. The percentage of fat must be kept low, because in these cases there is almost always a secondary disturbance of the digestion of fat. Protein is, therefore, the food element which is best borne. Starch may usually be given in small amounts, because, as it is slowly broken down and its end product, dextrose, quickly absorbed, there is never much sugar in the intestine at one time. Mixtures of skimmed milk with cereal diluents meet the indications in these cases very well. Albumen milk is also often useful. Foods of this character with very little fat and a minimum amount of sugar have relatively little caloric value. It is important, therefore, to add sugar to the food as soon as possible. The best form to use is one of the maltose-dextrine combinations, because the chemistry of the digestion and absorption of these forms of sugar is different from that of milk-sugar and cane-sugar. It is advisable, however, and in most instances possible, to change over to milk-sugar after a short time.

The first thing to be done in the treatment of infectious diarrhea is to thoroughly clean out the intestinal tract. All food should be stopped for from twelve to twenty-four hours, water or weak tea, sweetened with saccharin, if necessary, being given freely during this time.

The most important element in the treatment of infectious diarrhea is the diet. The character of the diet depends upon the variety of the microörganism which is causing the disease. These microörganisms can be divided, as far as the determination of the diet to be used is concerned, into two groups:

1. The various forms of the dysentery bacillus and the other organisms, except the gas bacillus, which cause the disease.

2. The gas bacillus and allied organisms.

The other organisms, although of many different varieties, are grouped with the dysentery bacilli, because as regards their growth and the production of toxic substances from protein and carbohydrate media, they behave in the same way.

The dysentery bacillus, the colon bacillus, and the streptococcus belong to the class of facultative bacteria. This class of organisms can thrive upon either carbohydrate or protein media. They produce harmless products from carbohydrates and toxic substances from protein. They act upon and use up the carbohydrate material before they attack the protein, when both are present in the medium in which they are growing. The products of the breaking down of the carbohydrate material have, moreover, when produced in sufficient amounts, an inhibitory action on the development of dysentery bacilli and, to a less extent, of streptococci.

It is evident, therefore, that when infectious diarrhea is caused by bacteria of this type, the food should be largely carbohydrate in character. In this way the organisms are prevented from forming toxic substances and their growth is, to a certain extent, inhibited. The prolonged withdrawal of food is also contraindicated, because the intestinal contents are then made up entirely of the intestinal secretions, which are protein in character. Some form of carbohydrate should, therefore, be given after a few hours. Milk-sugar is the most suitable, because, being more slowly broken down and absorbed than the other sugars, it provides a carbohydrate medium in the intestines for a longer time. It should be given frequently in small amounts, in the form of a 5-per-cent or 7-per-cent solution in water, in order that a continuous supply

may be brought to the intestines. It is advisable after one or two days to give the milk-sugar in barley water, containing from 0.75 to 1 per cent of starch. The starch provides more nourishment, and being still more slowly broken down and absorbed, favors still further the prolonged continuance of a carbohydrate medium in the intestines. Boiled skimmed milk should be added cautiously to the food as soon as improvement begins, in order to prevent too great protein waste of the organism. Care must be taken, however, not to give enough to neutralize the action of the carbohydrates. Intravenous injections of 2.5 per cent solutions of Kahlbaum's dextrose in physiological salt solution may be used in severe cases to furnish a carbohydrate instead of a protein medium for the bacteria which have entered the circulation to grow in and also to supply an immediately utilizable source of energy and to spare the body protein. Irrigation of the colon with solutions of lactose or dextrose, while theoretically indicated, is of little practical value.

The gas bacillus and allied organisms grow rapidly in the intestinal tract when there is an excess of utilizable carbohydrate in the bowel, and at the same time an insufficient number of those organisms which form lactic acid from carbohydrates to produce enough lactic acid to inhibit their growth, the gas bacillus being sensitive to lactic acid. The indications to be followed in the treatment of cases of infectious diarrhea caused by the gas bacillus are, therefore, to cut down the carbohydrates in the diet and to introduce lactic-acid-producing bacteria into the intestines. These indications can best be met by the use of unheated buttermilk, or, better, of mixtures containing no fat, 3 or 4 per cent of milk-sugar, and from 1.50 to 2.50 per cent of protein "ripened" with lactic-acid-forming organisms. It is not possible to cut out the sugar entirely, because if this is done the lactic-acid-forming organisms will have nothing on which to grow. The lactic acid already present in the food exerts an immediately inhibitory action upon the gas bacillus, while the lactic-acid-forming organisms in it, by keeping up the production of lactic acid, continue this action. They also use up the available supply of carbohydrate and thus interfere with the growth of the gas bacillus.

Cutting down the carbohydrates in the diet and increasing the amount of protein in it is sufficient to relieve the condition in mild cases. The percentage of fat should also be kept low. Mixtures containing from 1 to 1.50 per cent of fat and from 1.50 to 3 per cent of protein, with no more milk-sugar than is necessarily added in the milk and cream to give the desired percentages of fat and protein, are suitable ones. It is well to boil them in order to prevent the formation of casein curds.

INDICATIONS FOR LOCAL ANESTHESIA.

The *Boston Medical and Surgical Journal* of March 21, 1918, asserts wisely that as a general routine of operative clinics when there exists none of the accepted contra-indications to general anesthesia, and where the operation is sufficiently major to warrant rendering the patient unconscious, general anesthesia must still remain the most feasible method. But while general anesthesia renders the patient unconscious and free from pain, it does not render the organism free from the shock to the nervous structures engendered directly by reason of the operative hurt to the tissues. The sensibility of the nervous system and its centers controlled, the production of shock is not avoided by rendering the patient unconscious with the general anesthetic. In reality, it is only with local anesthesia that these conditions may be anticipated. The Crile method of anociassociation is the outgrowth of this circumstance. Unless the seat of the operation, where the hurt is administered to the tissues and to the irritable nerves, can be freed from communication with the general nervous system for the period of the operation, shock and the other by-effects of the operation will continue in spite of the anesthesia, the anesthetic, or the quality of the anesthetic. The

injection of the local anesthetic into the site of the surgical hurt renders it impossible for the shock of the operation to be transmitted to the higher centers. When, then, the general anesthetic is administered, there is the advantage of unconsciousness together with the freedom from shock.

Moreover, it is quite well understood that, no matter what general anesthetic is administered, it is highly toxic to the organism. Many of the postoperative complications, such as albuminuria, acidosis, etc., are directly due to the anesthetic. Of course, some anesthetics are better than others. At best, there is only a choice between evils. One anesthetic may be contraindicated in some conditions and under certain circumstances, another in other conditions and circumstances, but all of them have distinct contraindications, often hard to determine. Such mechanical conditions as the presence of mucus, congestions, and such diseases as nephritis, diabetes, sepsis, suppurative thoracic conditions, and the like, all make the administration of a general anesthetic dangerous.

Of course, there are untoward effects and dangers from the use of local anesthesia. Sudden death is not unknown. Yet local anesthesia is becoming more and more popular in major operations, and in operations where local anesthesia would never have been dreamed of only a short time ago. There is hardly any major operation which cannot be performed under local anesthesia. In minor operations there is hardly any excuse for rendering the patient unconscious and subject to all the after-effects, dangers, and annoyances of a general anesthetic. Local anesthesia often has the peculiar anomaly that the administration of the local anesthetic is out of proportion in point of time to the operation itself. But this is not a valid objection against it. Local anesthesia will not overcome spasm of the abdominal muscles, nor can local anesthesia be administered in mutilating, violent injuries where rapid surgical measures of an emergency character are indicated. In the latter instance it was always understood that, no matter how much the patient was in collapse from the shock of the injury, the general anesthetic had a therapeutic effect in relieving the shock, in the same way that the methods of anociassociation would anticipate it in surgical operations. However, the added shock to the patient of the remedial surgery would tend to overcome any benefit that the general anesthetic would bring about; but in such cases there is no alternative but to give the general anesthetic and operate, regardless of the question of the anesthetic or the operative shock. Whatever the indication, however, children and very nervous individuals are not good subjects for local anesthesia.

A CRITICAL DISCUSSION OF SUGAR IN ITS RELATION TO INFANT FEEDING.

HILL in the *Boston Medical and Surgical Journal* of July 4, 1918, in the course of an article on this topic answers the question, What sugar to feed to normal and abnormal babies? as follows:

Inasmuch as lactose is the natural sugar which a baby gets in breast milk, it seems only reasonable to use this in feeding normal babies. There is no good reason for feeding normal babies on any other sort of sugar. If the baby has a tendency to sugar fermentation, with rather frequent and loose stools, it is better to use one of the maltose-dextrine preparations, as these ferment less easily than does lactose. On the other hand, if the baby is having hard, soapy, alkaline stools, lactose is to be preferred, as it promotes normal fermentative processes in the intestine, and does away with the constipation. In this type of case large amounts of lactose can sometimes be fed without harm. The constipated, soapy type of stools is especially likely to be seen in babies who are fed on dextri-maltose in combination with rather a high protein percentage. There is not enough fermentation of the sugar to promote the normal persistaltic processes, and to make an acid intestine. An alkaline intestine favors calcium soap formation and constipation. Often the addition of

one of the liquid malt extract preparations will correct this type of constipation, or lactose may be added to the dextri-maltose already in the mixture, and increased until looser movements result. If, for one reason or another, it becomes necessary to feed an unusually large amount of sugar, it is best not to use lactose, as there is less risk of upsetting a baby with large amounts of a maltose-dextrine preparation than with equal amounts of lactose. It must be remembered, however, that maltose is not a specific for all sugar troubles, and that certain babies do not do at all well on it. Sucrose has as its only advantage that it is cheaper than any of the other sugars, and it is well not to use it unless for financial reasons, as it is not a good plan to have a baby develop a sweet taste. Sucrose seems to ferment with about the same readiness that lactose does.

As to the amount of sugar to be fed, it is very difficult to exceed the sugar assimilation limits of a baby, because almost always vomiting or diarrhea results before this state is reached. Babies vary immensely in the amount of sugar that they can take. The usual rule is not to exceed 7 per cent of sugar in the formula, and in general this is a good rule to follow, but may often be broken with advantage. There are many babies who cannot digest fat well, some who cannot digest protein well, and in these cases the sugar digestion is often very good, and a large amount of sugar may be fed without causing any disturbance. This is a truth that we often do not realize in difficult feeding cases. In babies with loose bowels the sugar cannot usually be much increased, but in a certain type of baby who does not gain, who does not digest fat, and who has constipated stools, a large amount of sugar can be fed with perfect safety. Hill writes of a baby, six months old, who cannot take over 1.25 per cent of protein without diarrhea and vomiting, and who never could be made to gain until she was put upon 10 per cent of sugar, partly as lactose. There are a good many babies of this type, he believes, and high sugar feeding seems to send them ahead faster than anything else. The nitrogen needs must be covered, of course, and the minimum of protein necessary for this should be given. Ordinarily in these cases one of the maltose-dextrine preparations is the best sort of sugar to use.

The relation between the sugar and the other food elements, particularly the fat, is important. A very high sugar should never be offered in conjunction with a high fat. It is possible many times to feed a high sugar with a high protein, but in general if the sugar is to be varied it is best to keep the other food elements low. In certain difficult feeding cases Hill is in the habit of having the baby's formula made up with perhaps 6 or 7 per cent of sugar and then instructing the mother to add one or, later, perhaps two teaspoonfuls of sugar to each feeding. In this way the baby's sugar tolerance may be tested, and the sugar can be pushed to just under the limit. It is quite surprising to see how well some babies will do on this high sugar feeding, and how rapidly they will gain. They must be kept under close observation, however, for sugar diarrhea may occur at any time. The work of Dunn and Porter is interesting in this connection. They fed a number of babies on high sugar percentages, in many cases as high as 15 or 18 per cent, and as a result of these studies arrived at the following conclusions:

"The idea of sugar injuries and sugar intoxication has possibly kept us from the use of large amounts of soluble carbohydrate in certain cases, particularly in those unable to take a quantity of fat sufficient to meet their nutritive requirements. That many such babies have intolerance for sugar is undoubtedly true. But the danger of pushing the sugar to the limit of tolerance we believe to have been exaggerated. The signs of sugar indigestion are distinct and easily recognized, and do not appear to be in any way serious. In many cases great benefit appears to be obtained by greatly increasing the carbohydrate content of the food, and this proceeding may prove a valuable addition to their stock of resources in dealing with difficult feeding cases."

In calculating the required amount of sugar to add to a mixture to secure a given sugar percentage, one of two methods may be used. The weight of the sugar may be calculated in relation to the amount of the total mixture, remembering that two rounded tablespoonfuls of lactose weigh about an ounce. Then, if we want to add, let us say, 3 per cent of lactose to a thirty-two-ounce mixture,

3/100 of 32 oz. = 1.00 (approx.) = 1 oz. or 2 rounded tablespoons.

The next method consists in the use of a table.

One level tablespoonful of sugar raises the sugar percentage:

2.40% in a 16-ounce mixture.
2.00% in a 20-ounce mixture.
1.60% in a 24-ounce mixture.
1.20% in a 32-ounce mixture.
1.00% in a 40-ounce mixture.
.95% in a 42-ounce mixture.
.80% in a 48-ounce mixture.

Weights and Measures.

3 level teaspoons = 1 level tablespoon.
2 level tablespoons = 1 large kitchen spoon.

Cane sugar is considerably heavier than lactose or the dextri-maltose preparations, and this should be taken into consideration in using it.

	Cane sugar.	Lactose.	Dextri Maltose.
1 level tablespoon	= 15 gm.	—10 gm.	— 9 gm.
1 rounded tablespoon	= 25 gm.	15 gm.	14 gm.

THE USE OF DRUGS IN POOR SUGAR DIGESTION.

In the *Boston Medical and Surgical Journal* of July 4, 1918, HILL expresses the belief that in most cases of sugar fermentation drugs are of little value; in some cases they are needed. The drugs that have been used may be divided into two classes: (1) Those which are directed against the diarrheal process itself. (2) Those used as stimulants.

1. Often in private practice it is necessary to give some drug on account of the state of mind of the family. They feel that the baby is not being treated correctly if he gets no medicine. Under these conditions chalk mixture or bismuth may be given. The chalk mixture is mildly alkaline, and may do some good in helping to neutralize the acids which are present in the intestine, although this is accomplished much more efficiently by a suitable regulation of the food supply. Bismuth subcarbonate has been used for years in the treatment of diarrheas of all sorts; it is mildly astringent, and probably slows the intestinal peristalsis somewhat. Its chief disadvantage is that it turns the stools black, and thus makes it difficult to judge of their true character. These two drugs can do no harm and may do some good.

Intestinal antiseptics, such as salol, calomel, etc., are of no value, and should not be given, as it is quite impossible to sterilize the intestine, or to influence its bacterial flora enough to amount to anything in this way. Here, again, the character of the food supply is the most important factor to consider.

Opium in some form, usually as paregoric, has a definite place in the treatment of some cases of sugar fermentation. It should never be given as a routine, but only when the watery diarrhea and tenesmus is so excessive as to exhaust the child. Opium has its dangers, for if the diarrhea is stopped by it, the absorption of toxic material is favored, but in many cases where the child is worn out by excessive straining and tenesmus, its use seems to be the lesser of two evils.

2. Stimulants may be often needed, of which the most valuable are caffeine, camphor in oil, adrenalin, and brandy. Personally, he prefers caffeine citrate, or caffeine sodium benzoate, subcutaneously, given in rather large doses. Camphor in oil is also valuable for a failing circulation, but as a general stimulant cannot be compared with caffeine. Brandy or whisky, ten or fifteen drops subcutaneously, is a valuable stimulant for one or two doses, but should not be used continually, as each period of stimulation is followed by a period of depression. Caffeine or camphor is, Hill believes, in most cases superior to alcohol. The subcutaneous injection of one or two minims of a one-to-one-thousand adrenalin chloride solution may be of service where there is

circulatory collapse with very low blood-pressure. Its action is, however, only fleeting.

As a brief summary Hill says that the two most important things in the treatment of sugar fermentation are proper feeding and plenty of water, and that most cases may be controlled by these alone, without the use of any other special method of treatment.

PARALYSIS AGITANS AND ITS TREATMENT WITH PARATHYROID GLAND.

BERKELEY in the *Medical Record* of March 2, 1918, states that the confusion and contradictoriness of autopsy reports long ago led C. L. Dana and others to advance the view that a chronic toxemia lies at the base of the disease; and it was suggested by Lundborg of Stockholm in 1904 and by Berkeley independently in 1905 that a chronic dyscrasia or insufficiency of the parathyroid glands is quite possibly the cause of the disease.

Berkeley's own reasons for this view have been frequently stated before, and need be only summarized now: (1) The symptoms appearing in rabbits and other convenient experimental animals upon removal of the parathyroid glands are suggestive; shivering and twitching of the voluntary muscles, rigidity, convulsions, salivation, and often a quite typical "propulsion" may be observed. (2) The disease has been reported several times in conjunction with myxedema, and with exophthalmic goitre, where the contiguity of the diseased thyroid might well be supposed to work mischief to the parathyroids. (3) The parathyroid glands have been reported in a diseased condition in a fair percentage of the autopsies upon cases of paralysis agitans. (4) The use of a properly prepared parathyroid extract by the mouth, or better by hypodermic administration, has been productive of remarkable benefit in a majority of the cases treated. This therapeutic test has been applied to hundreds of cases during a period of more than ten years past; and the treatment has shown a steady and gratifying increase in popularity.

Admittedly these considerations are by no means a demonstration of the etiological relation of shaking palsy to parathyroid insufficiency; but the hypothesis certainly comes within the bounds of reasonable scientific speculation.

By the profession, both here and in Europe, during the last ten years the parathyroid theory has been received with considerable favor. In International Clinics for 1912 Berkeley reviewed the literature—most favorably—up to that date. Since then J. Greenwald has advanced some interesting but Berkeley does not think conclusive chemical considerations against the parathyroid theory. Troemner thinks the parathyroid hypothesis "possible;" and Schioetz defends it with considerable enthusiasm.

Berkeley takes up finally the clinical administration of parathyroid, as he is accustomed to give it.

First of all, it is absolutely necessary that an efficient preparation, made from perfectly fresh and carefully identified glands, should be used. The chemical details of Berkeley's own extraction process, which he has worked out after many years of experiment, have been published in several places, and need not be again detailed here. His formula is now for sale by several pharmaceutical wholesalers. It comes in small capsules (one-fiftieth grain of parathyroid extract in milk sugar), and as hypodermic solution; the latter is marketed in small rubber-stoppered bottles of five mils. The hypodermic is the ideal preparation, but is more expensive, and many patients do very well on the capsules.

The dose by the mouth is one capsule two to six times a day, preferably after eating. The hypodermic solution is given in doses of one or two mils once or twice a day. One mil contains one-fiftieth grain of the extract. This arrangement evidently mixes the metric and English systems, but is justified by its convenience, and is easily remembered. The solvent is physiological saline solution. A trace of chloroform is

added as a preservative. Aseptically injected, the hypodermic solution should be absolutely without reaction.

The benefits of treatment usually appear slowly. They consist in diminished rigidity, shaking relieved or arrested, restlessness and insomnia relieved, and salivation abolished. In some of the cases now and then quite a miracle is performed, as for example in a report recently published by Martyn. The writer states that the patient, whose condition had been desperate, was so remarkably benefited that he was enabled to bathe and dress himself, read and write comfortably once more, sleep well, and amuse himself by pruning his own orchard trees again—a pleasure in which he had not been able to indulge himself for a long while. The only setback occurred when for a period of a week or so he was unable to get a fresh supply of the medicine. Berkeley himself last year reported two cases which have lately attracted his special notice. One of them, the father of a medical associate, has been literally kept alive by Berkeley's parathyroid formula these ten years back.

Contraindications are very few. Personally in many years, and with more than a hundred patients, Berkeley has seen only one, an elderly man, who could not take ox-parathyroid at all. He seemed to have an anaphylactic sensitiveness to the foreign proteins. This may also have been the trouble with a patient reported to Berkeley last year.

Some patients get "nervous," and shake worse when the dose is pushed too fast. To these the remedy should be given in divided and infrequent doses till they become accustomed to it. Berkeley has one patient who is sure the parathyroid constipates him; but he overcomes this very easily with a simple laxative.

Improvement is often noticed in two weeks, very generally in two or three months; and it should continue for a few months more. After this the remedy should be indefinitely continued, but in smaller doses—just enough to maintain the benefits already secured.

Cardiac disease, arteriosclerosis, and albuminuria are no contraindications. These conditions may even improve under the parathyroid treatment. None of the textbook remedies for the intercurrent diseases of old age is incompatible with parathyroid extract. Hyoscine and parathyroid sometimes go very well together, working better than either alone.

Easy travel often benefits these patients, and they are appreciably sustained by cheerful company, a hopeful environment, or perhaps an appeal to their religious faith. Institutional cases do badly, for reasons too apparent to require amplification. The sufferer should by all means be kept out of a hospital atmosphere.

Under these circumstances, and with an intelligent individual application of the principles of treatment outlined above, these patients often do very well for many years, reaching and passing the scriptural threescore and ten with but little more inconvenience than usually befalls normal old age.

DOES THE IRRITANT ACTION OF EMETINE HYDROCHLORIDE EXTEND TO THE KIDNEYS?

In the *Philippine Journal of Science* for January, 1918, La Paz and Montenegro have studied this question, using dogs. They state that the examination of the urine does not give conclusive evidence that emetine has induced inflammation of the kidneys. The appearance of albumin in the urine of dog 1 on the second day of emetine injection and in the urine of dog 3 on the fifth injection cannot be due to inflammatory changes; otherwise it should have appeared on the succeeding days and its quantity should have been increased by the subsequent injections of emetine. La Paz and Montenegro cannot explain the significance of the short hyaline casts that appeared in the urine of dogs 1, 2, and 3. They also observed them in the urine of three saline controls. However, the fact that their appearance was not accompanied by albumin except in one instance (that is, on the fifth injection in dog 3) diminishes

their importance as a sign of inflammatory lesion of the kidneys. This is confirmed by the examination of the sections of the kidneys. When examined histologically, the kidneys of dog 1 showed very slight acute parenchymatous degeneration; the kidneys of dog 2 showed congestion and its results, hemorrhages between the layers of the capsules, and slight, if any, degeneration of the tubular epithelium; the kidneys of dog 3, congestion and slight degeneration of the tubular epithelium only; and the kidneys of dog 4, very little recognizable pathological change on account of extensive post-mortem alteration. The absence of the inflammation that emetine readily induces in the eye, respiratory passages, alimentary canal, and subcutaneous tissue indicates that it is not eliminated by the kidneys, or if it is, that it passes through them in very high dilution.

THE PRINCIPLES OF TREATMENT IN MERCURIC CHLORIDE POISONING.

In the *Journal of the American Medical Association* of March 23, 1918, SANSUM records a study made upon dogs and reaches these conclusions:

1. There is no sound experimental basis for the belief that the promotion of free diuresis contributes materially to the chances of recovery in mercuric chloride poisoning, and this phase of treatment should not be permitted to obscure that which is more essential.

2. Combined treatments which involve sweating, diuresis, and increased elimination from the bowel probably owe their value chiefly to the latter effort.

3. It would appear in the light of the present study that when 4 mg. or more of mercuric chloride per kilogramme of body weight has entered the tissues at large, death regularly occurs, and that we have no adequate grounds for believing that death is preventable by any known form of treatment. Whereas subsequent studies may add to our knowledge, it would appear that persons who have recovered from mercuric chloride poisoning owe their lives to the fact that a lethal dose has never gained access to the extraportal circulation. Practical therapeutic efforts should be directed frankly toward the accomplishment of two things: (1) Mechanical removal of the poison from the lumen of the alimentary tract. (2) Antidoting the poison before it leaves the portal circulation—that is, particularly before absorption.

NON-OPERATIVE TREATMENT OF SINUS INFLAMMATION.

LANGWORTHY, in the *Journal of the Iowa State Medical Society* of March 15, 1918, points out that while much might be said with reference to anatomical situation and peculiarities of each sinus, a generalization is all that is necessary here, and from a practical standpoint covers the ground. He thinks it is fair to say, in the main, that most cases of acute sinusitis will quite readily subside if given time and active nasal treatment, combining all the usual non-operative rhinological remedies commonly used by the experienced rhinologist, such as application of pledgets of cotton soaked in cocaine and adrenalin to the swollen middle and inferior turbinates, douching and spraying with the proper alkaline and oily solution, internal remedies useful for acute coryza in the early stages—cold compresses or an ice-bag occasionally to the forehead, suction, etc. Surgical interference is not at all necessary for the average acute attack. Even in quite bad recurring acute cases in which one might sometimes think pretty seriously of a sinus operation, a well-directed middle turbinotomy, taking in the so-called "vicious circle" of the nose, should certainly be tested at length before going farther. In other words, the establishment of free drainage and ventilation which automatically provide exit for morbid material in sinuses is sufficient in most cases for a cure, and obviates the necessity for either the administration of autovaccines or more radical surgery. By no stretch of the imagination is it justifiable to consider every acute frontal sinusitis as demanding the removal of the

anterior half of the middle turbinate, or every severe case of a distinct type as requiring a radical sinus operation. That a few cases may possibly need it is admitted, of course, but they are relatively few, and our active non-operative measures should rule when possible.

The true chronic accessory sinus cases, fortunately not relatively common, when we do get them, demand a little special consideration, and their treatment must be considered from slightly different angles than the acute cases. Many chronic cases will do pretty well following the removal of intranasal blocking either with or without lavage. Still severer types, however, tax our ingenuity no matter what line of treatment may be pursued.

That this is true is shown by the fact that chronic polyp formation and "cold abscess," if you will, mean serious bone involvement and caries, and as such may not necessarily yield to extensive operation at all so far as a definite permanent cure is concerned. In many of these cases constitutional factors are often of as much importance as local ones. That something surgical usually has to be attempted, however, goes without saying, but Langworthy is inclined to think that the thorough removal of sufficient amounts of polypoid turbinates with perhaps a portion of the ethmoid labyrinth, promoting free nasal ventilation, together with providing a single large additional opening into the sinus at its most dependent position from the nose for the purposes of future treatment, will in a great many instances give the necessary practical relief, and promote the welfare of the patient quite as much as some of our too extensive radical multiple sinus operations.

Chronic sinus disease has therefore its two sides in selected cases just as much as the acute type, the one wholly surgical and the other more medico-surgical, if Langworthy may use the term. When even our "master workmen" are baffled by certain aspects of these chronic cases, and by the varying conditions present, one must feel very sure of one's ground and have in mind a definite plan of action which can be carried to a presumably successful conclusion before beginning any extensive radical operating. It is in such patients often that one operation seems only to lead to another, either on the nose or elsewhere, and sometimes in the course of two or three years these patients have undergone various operations and are still to be found in the more or less invalid class.

To sum up, Langworthy would say that while every acute case may in a few hours become a candidate for strictly surgical consideration, if it can be kept under proper observation, well-directed, non-operative intranasal measures and "treating symptoms as they arise" will suffice in a great many instances, and should always be given a reasonable trial. If attacks are found to recur, the removal of intranasal spurs, deviations of the septum, and turbinotomy, combined with an intensive study of the particular individual, will then be most apt to obviate the necessity and danger of a later radical sinus operation. The chronic cases also should be dealt with on as rational a basis as possible. In a discussion as broad as the one here outlined, Langworthy is inclined to think that, when finished, a rather remarkable unanimity of opinion along the same line will be shown relative to our handling of the general run of both acute and chronic cases and the difference in view, if difference there be, apt to result from concentration of thought more on some special case rather than on the average patient of whom he is speaking.

SURGICAL SHOCK.

The *British Medical Journal* of February 23, 1918, states that at the end of February, 1917, the Medical Research Committee issued a memorandum on surgical shock and some allied conditions, which was published in full on March 24, 1917, in the *British Medical Journal.* In August, 1917, the committee appointed a Special Investigation Committee to coödinate inquiries into surgical shock and allied conditions, with a view to the correlation of laboratory and clinical observations. It consisted of Professors E.

H. Starling (chairman), F. A. Bainbridge, W. M. Bayliss, W. B. Cannon, M.D. (Harvard, Captain M.O.R.C., U.S.A.), A. N. Richards, Ph.D. (University of Pennsylvania), C. S. Sherrington, Surgeon-General Cuthbert Wallace, Colonel T. R. Elliott, Captain John Fraser, R.A.M.C. (of Edinburgh), with Dr. H. H. Dale as secretary.

The Medical Research Committee has now received three reports through the Investigation Committee, and these have been printed for official distribution; but as they are of an interim nature they will not be placed on sale until the investigation has proceeded further, when it is hoped that a volume may be issued for sale.

The first report, on intravenous injections to replace blood, by Professor Bayliss, brings down to a later date (November 25, 1917) the results of his researches as detailed by himself in the *British Medical Journal* of April 28, 1917, p. 564, and in his paper to the Royal Society, a note upon which was published in the *British Medical Journal* on December 8, 1917, p. 772.

The third report (January 7, 1918), by Captains Hamilton Drummond and E. S. Taylor, R.A.M.C., discusses the use of intravenous injections of gum acacia in surgical shock. They used clinically the solution mentioned in the February memorandum of the Medical Research Committee, with the addition of gum; the formula is, sodium chloride 2 grammes, potassium chloride and calcium chloride, of each 0.05 gramme, powdered gum acacia 5 grammes, distilled water 100 Cc. The solution was made in a mobile laboratory by Major J. W. McNee, and, to remove all particles, was filtered through paper pulp under pressure before being autoclaved. More recently it has been found convenient to make up a solution of five times this strength, and to dilute with sterile water as required. No untoward effects were observed, and at necropsies on cases which succumbed from their wounds after transfusion no pathological lesions dependent on the fluid introduced (thrombosis, etc.) were met with. The fluid must be introduced very slowly, allowing fifteen to twenty minutes for each pint injected. The transfusion has been carried out with the ordinary apparatus used for injection of saline, the solution being kept at 118° F., and a pint being the amount usually given at one time. The best results were obtained in hemorrhage attended by little shock; fair results were met with in hemorrhage with shock of moderate severity; little improvement was obtained in cases of advanced shock dependent on severe damage to hollow viscera. The great importance, in wounds of the extremities, of arresting all possible sources of hemorrhage before transfusion is pointed out; otherwise, as the blood-pressure rises, hemorrhage may at once begin again and leave the patient worse off than before. In some severely lacerated limbs it was found best simply to apply a tourniquet before the transfusion was begun and to deal with the bleeding points at the subsequent operation. In cases of intra-abdominal hemorrhage the practice has been to start the transfusion at the beginning of the operation, losing no time in finding the sources of the bleeding immediately the abdomen is opened.

The second report is the joint production of Captains Cannon, E. M. Cowell, J. Fraser, and A. N. Hooper. It consists of a series of papers on blood-pressure in wound conditions, on alterations in the distribution and character of the blood, on acidosis, and on the initiation, nature, and preventive treatment of wound shock.

THE VALUE OF PITUITARY EXTRACT IN INCOMPLETE ABORTION AND PLACENTA PREVIA.

LIPKIS, in *Northwest Medicine* for March, 1918, tells us that during the past year he has treated incomplete abortion cases with small doses of pituitary extract without any curettement or packing, with perfect success. He usually gives ½ Cc. pituitary extract hypodermically every day or every other day until the placenta is expelled. The longest it took in one case was five days; often it requires only two to three days.

The amount of bleeding during the whole

time is no more than for an ordinary menstrual period, usually less than that. The general condition of the woman after getting through her confinement was a good deal better than that of a woman who with a similar condition was given an anesthetic and curetted.

The mortality in miscarriages is given by all authorities as greater than that of pregnancy at term. Taussig states that the mortality figures for miscarriages as given in most text-books are too low. He quotes authorities whose figures reach as high as 2 and 4½ per cent, depending on whether it is spontaneous or induced. "The dangers from operative interference," he states, "are fourfold: (1) the danger of infection from the instruments and the hands of the operator; (2) the danger of severe hemorrhage; (3) the danger of perforation to the uterine wall; (4) the danger of cervical laceration." By the use of pituitary extract the above dangers can be avoided and the mortality materially decreased.

ACTION OF ALCOHOL.

The *British Medical Journal* of February 23, 1918, deals editorially with the report to which we have already referred in a leading article in our April issue. The *British Medical Journal* states that it is a very balanced document, and will not altogether please the advocates of total abstinence, inasmuch as it shows that some of their habitual statements are exaggerated. At the same time it does not give the believer in the extraordinary merits of alcoholic beverages any ground to rejoice. The most it can say in his favor is that the temperate consumption of alcoholic liquors, in accordance with certain rules of practice, may be considered to be physiologically harmless in the case of the large majority of normal adults, and that this conclusion is fully borne out by the massive experience of mankind in wine-drinking and beer-drinking countries. But it adds that it is true that alcoholic beverages are in no way necessary for healthy life, that they are harmful or dangerous if the precautions advised are not observed, and that they are definitely injurious for children and for most persons of unstable nervous system, notably for those who have had severe injuries of the head, or who have suffered from attacks of mental disorder or from nervous shock.

The Committee points out that the main action of alcohol, apart from the effect of its continued excessive use, is confined to the nervous system, that it is narcotic rather than stimulant in action, that its nutritional value is strictly limited, and that its habitual use as an aid to work is physiologically unsound.

On the vexed question of the formation of the alcohol habit and the existence of craving the Committee expresses the opinion that the person who is in the habit of taking alcohol takes it primarily for the sake of the agreeable effects produced through the nervous system, because he finds that it relieves the sensations of fatigue, and because he believes that it gives him increased energy for his work. It is held that while the return or persistence of these motives undoubtedly contributes to the regular use of alcohol it differs from such habit-forming drugs as opium and morphine in the fact that its sudden withdrawal causes less severe symptoms and that no high degree of tolerance is acquired by its prolonged use; but it is pointed out that these are differences in degree rather than kind.

In regard to the common use of alcoholic beverages in moderate quantities, such as the habit of many people to take wine or beer with meals, the Committee expresses what we conceive to be the sound view, namely, that these beverages are taken because to the majority the taste and immediate effects are agreeable, and that the pleasure derived therefrom outweighs their estimate of remoter harm, if any thought be given to such ulterior considerations. "To the abstainer either the taste or the immediate effects are not agreeable, or the remoter ill, whether real or imaginary, seems more important. Each class manufactures arguments in favor of its own line of conduct."

The report does not deal with the social

evils or moral problems which result from the excessive use of alcoholic liquors, but solely with the physiological aspects of the alcohol question. The precautions the report recommends are that the ordinary use of alcohol should not only be moderate, but that it should be taken at intervals of time sufficient to prevent the persistent presence of a deleterious amount of the drug in the body, and that to avoid direct injury to the mucous membrane of the stomach, alcohol should not be taken in concentrated form and without food. There are two or three useful appendices: one of these shows that we have found it difficult to come by, namely, the amount of proof spirit and of absolute alcohol in the usual retail measures of the ordinary alcoholic beverages.

The report is a very guarded statement, but as an impartial presentment of the case will be found extremely useful and informing.

TREATMENT OF PAPILLOMATA AND INGROWING TOE-NAIL WITH FORMALDEHYDE.

The *Practitioner* for March, 1918, states that Suldey describes a simple method for the treatment of papillomata and ingrowing toe-nail which gives excellent results. For papillomata, especially venereal warts, an application is made once each day, in the evening by choice, of the ordinary solution of formaldehyde, by means of a small swab of wool, preferably on a holder. This is well soaked in the formaldehyde, and then each growth is touched on the surface. Cure depends on the size and number present, but may be expected in from four days to a fortnight. The surface of the wart becomes gradually blanched, and after the third day the dead layers of tissue begin to get detached, to be followed shortly by complete disappearance of the growth. The application is painless and very easily borne. It only gives rise to a slight irritation, which passes off in two or three minutes. The formaldehyde must not be allowed to touch the healthy mucous membrane, although no serious result follows should this occur. If there is a large collection of these growths, it is advisable to deal with them in successive areas. When all have fallen off, a small superficial ulcer is sometimes left. This quickly heals by applying some drying powder—bismuth, talc, oxide of zinc, etc. Relapses have never yet been seen to occur.

For ingrowing toe-nails, the technique is practically on the same lines. The granulations are touched with the swab all over the seat of the lesion, and a thin layer of liquid is allowed to spread under the edge of the affected nail. This is repeated daily. The pain stops almost at once, all inflammation subsides, and recovery is complete, on the average, in four or five days. Relapse of the condition is best prevented by avoiding the cause of the trouble.

THE TREATMENT OF PNEUMONIA.

In the *New York Medical Journal* of March 16, 1918, IVES concludes an article on this topic with the following statement:

"The successful care of pneumonia demands a physician who is alert, accurate in diagnosis, thoughtful, resourceful, and determined, one who is ready to resort to positive measures, if needed, and who knows no relaxation till the patient has wholly recovered or the battle is lost; one who can control the case with power, and sustain the patient, family, and friends through his vigorous and dominant personality. Success must be his motto."

There may be nothing new in these lines, but there is much truth in them.

TREATMENT OF PYELOCYSTITIS IN INFANCY.

In *Northwest Medicine* for March, 1918, GRULEE says that in order that we may use the most effective means for overcoming the infection, it is necessary that the infecting organism be known. In the majority of instances this is the B. coli. As is well known this organism does not grow well in an alkaline medium. The treatment which has proved most effective in Grulee's hands dur-

ing the acute stage consists in giving large quantities of alkalies at frequent intervals. To a young baby under six months of age one should give a mixture of 10 grains of soda bicarbonate and 10 of potassium citrate every two hours. This should be continued night and day, as it is of paramount importance that the urine be rendered alkaline as soon as possible and be kept strongly alkaline.

The effect of this upon the urine may be determined by placing a piece of red litmus between the folds of the diaper. If the diapers are changed frequently—that is, before decomposition of the urine can take place—it is possible to tell how soon the urine becomes alkaline and whether it remains so or not. In case the quantity of alkali given is not sufficient, the dose should be immediately increased. This treatment should be kept up for from four days to a week, depending to a great extent upon the quantity of pus in the urine and the temperature curve. [We believe it is better to make the urine as advised below.—ED.] After the temperature has subsided and the quantity of pus in the urine is appreciably reduced, one may stop the alkalies and give hexamethylenamine to the amount of 3 to 5 grains four to six times a day, depending upon the age of the infant. During the first twenty-four hours it may be wise to give acid sodium phosphate until the urine becomes acid, since the hexamethylenamine acts only in an acid medium.

If possible one should test the urine to see if formaldehyde is present. Occasionally a case is seen in which no formaldehyde is found and there is no inhibitive action of the hexamethylenamine on the infection. In these cases salol is frequently of value. It is necessary that the urinary antiseptic be kept up over a long period, even after the pus has practically disappeared from the urine. The condition shows such a marked tendency to recur that it is only by this means that we are able to overcome the infection.

In the more chronic stages of the condition Grulee has used autogenous vaccines in some of the cases in an attempt to overcome a chronic infection, but in none of these has he been successful. In others, after the infection had been apparently conquered, a course of autogenous vaccines was given in order, if possible, to prevent recurrence, but this has been so frequent that Grulee has abandoned their use. One should always remember that the condition, especially in young infants, is accompanied by more or less nutritional disturbance, and careful attention to diet and hygiene is necessary.

IRITIS AND ALLIED INFLAMMATIONS.

In *Colorado Medicine* for March, 1918, JACKSON states that it must be recognized that even the most careful investigation leaves the etiology of iritis in doubt. But all recent evidence supports the view previously held by ophthamologists that all cases of iritis not due to trauma, or previous inflammation of adjoining parts, are due to extra-ocular causes. In iritis, as in most diseases, the important part of the treatment is the removal of the cause.

The curative treatment of iritis is chiefly extra-ocular. It belongs at least as much to the internist or the general practitioner as to the ophthalmologist. When a case of iritis is referred to an ophthalmologist by a general practitioner who has made no effort to discover its cause, it may be the first duty of the ophthalmologist to whom the case has been referred to call in some other practitioner, or consultant, to help him in the investigation of the case; and in pursuing such a course he gives the colleague who referred the case to him no just ground for complaint.

REPORT ON THE TREATMENT OF FIFTY-EIGHT CASES OF EPIDEMIC POLIOMYELITIS WITH IMMUNE HORSE SERUM.

To the *Journal of Infectious Diseases* for April, 1918, ROSENOW makes a report and states that intravenous injections were made to the exclusion of intraspinal injections for the following reasons:

1. The best results were obtained by this method in the protection of monkeys against

virus. The serum was activated for the same reason.

2. Invasion of the nervous system in poliomyelitis is only a part of a more or less generalized systemic infection (Flexner and his coworkers). This was particularly true in this epidemic. Infection of the tonsils, the cervical and mesenteric lymph glands, and the gastrointestinal tract was often marked.

3. The spinal fluid in poliomyelitis is known not to contain the virus. The disease process is situated chiefly in the depths of the cord, which can best be reached through the circulation, particularly if lymph drainage toward the spinal canal is promoted by the withdrawal of spinal fluid.

4. Intraspinal injections of immune serum, human or horse, are known to be irritating and at times dangerous. They may produce, to quote Draper, "severe pictures of meningeal irritation, with vomiting, opisthotonos, and sometimes convulsions." Peabody warns against intraspinal injections in patients who have already developed paralysis. Moreover, intraspinal injections of serum increase the susceptibility of monkeys to intravenous inoculation of virus (Flexner and Amoss). Hence, any good which follows intraspinal injections of immune serums occurs in spite of these primarily undesirable and at times probably harmful effects.

Altogether, 94 intravenous injections were made. In no instance was there a primary toxic action noticeable, and in only six (10 per cent) was there later evidence of serum disease. If the temperature was normal no rise occurred; if above normal, an immediate drop without an initial rise was the rule, especially early in the disease. In this respect the action of the serum differed from that following intraspinal injection of immune human (Zingher, Amoss and Chesney, Draper, and Peabody) or immune horse serum (Nuzum and Willy), when, owing probably to the toxic action of the serum on the meninges, there is often first an initial rise in temperature and then a drop.

The low incidence of serum disease in Rosenow's series, 10 per cent, as compared with the incidence of 33 per cent in Nuzum and Willy's series, and apparently a more immediate beneficial effect, may be due (aside from an apparently more powerful serum, the agglutinating power being much higher, smaller doses being necessary to be effective) to the fact that intravenous injections only were given.

The exact mode of action of the serum is not definitely known. However, it is probably specific in nature and not due to nonspecific effects, because normal horse serum and the serum of Horse 3 (with and without cresol) injected with strains which had lost their specific antigenic properties had little or no protecting power against virus in monkeys.

Altogether, 58 patients with poliomyelitis, irrespective of the severity of type of the disease, were treated. Of these 10 died, a total mortality rate of 17 per cent. Excluding seven of the fatal cases, in which the patients were practically moribund at the time of the serum treatment, there were three deaths, a mortality of 6 per cent, in 51 cases in which the serum had a fair chance. This is in marked contrast to the 23 untreated cases, in which nine patients died, a mortality of 35 per cent. Including the moribund patients as untreated, there were 16 deaths in 30, a mortality of 53 per cent. That the patients treated in the early stages were undoubtedly cases of poliomyelitis is indicated by the symptoms, the increased pressure of spinal fluid, the cell count, the positive globulin test, and by the fact that in two cases not poliomyelitis in which spinal puncture was done no cells were found in the spinal fluid, and the globulin test was negative. One of these was an emaciated baby nine months old with fever, vomiting, persistent diarrhea, green stools, and repeated convulsions. The other was a girl five years of age with severe headache, high fever, vomiting, full, rapid and bounding pulse, and enlarged, acutely infected tonsils from which cheesy plugs were expressed. Moreover, the findings in these two cases are in accord with those of Wells, who has found few or no cells and no in-

crease in globulin in the spinal fluid of patients presenting symptoms in common with acute poliomyelitis.

Paralysis did not develop in a single instance when treatment was begun before its onset, and all recovered. According to Draper (cited by Peabody) about 50 per cent of proved cases develop paralysis if untreated. A comparison of results of the treatment of preparalytic cases by immune human and immune horse serum is of interest in this connection. Eighteen per cent of 54 patients treated by Zingher with immune human serum developed paralysis with no deaths. Twenty-nine per cent of the 14 patients treated by Amoss and Chesney developed paralysis and 14 per cent died. Thirty-one per cent of 51 patients treated in Peabody's series developed paralysis and 10 per cent died. None of 14 cases treated by Nuzum and Willy developed paralysis, but one, or 7 per cent, died. In Rosenow's series of 16 preparalytic cases none developed paralysis and none died.

No extension occurred following the giving of serum in the patients who recovered and in whom paralysis was marked at the time of the serum treatment. In only three or possibly four patients, or 8 per cent, receiving the serum will there be permanent impairment of function, and in all but one this will be slight. Wickman's 530 patients showed residual paralysis in 56 per cent one and one-half years later. Massachusetts records cited by Draper show a permanent paralysis of 83 per cent. The good effect was not due wholly to withdrawal of spinal fluid because the amount removed was relatively small in all cases and too small to have any possible effect in a number in each group which showed striking improvement.

The drawing of conclusions as to the exact value in this disease of any treatment is most difficult. Considering all the facts, however, the serum used appeared to have a prompt and powerful beneficial effect in a very large percentage of the patients treated. Its harmlessness, at least, is demonstrated and its use on a large scale indicated. The treatment should be given before paralysis has developed, hence early diagnosis by spinal puncture should be made. The course of this disease should be considered in terms of hours, not days, particularly now that there is available what appears to be a curative serum. The serum is of distinct benefit at least as long as postparalytic pains are present or the spinal fluid is positive. The strikingly favorable result in Case 1008 indicates that the serum will be of value in the treatment of sporadic poliomyelitis.

The fact that so many patients recovered completely in such a remarkably short time following injection of this serum indicates that the pleomorphic streptococcus is not merely a secondary invader, but is in some way, as yet partially obscure, the cause of epidemic poliomyelitis.

TRANSFUSION IN OVER TWO HUNDRED CASES.

The *Boston Medical and Surgical Journal* of March 14, 1918, contains an article by KIMPTON on this topic. He says that transfusion may be said to be of value as follows:

Its greatest field of usefulness is for—

1. Acute secondary anemia—that is, severe hemorrhage. For so-called "shock," uncomplicated by hemorrhage, it may be of great value, but too much has been claimed for it. For hemorrhage of new-born babies, transfusion is specific, and the use of the longitudinal sinus, as advised by Helmholz, is one of the most valuable advances of surgical technique. The tube is filled through the needle and emptied into the longitudinal sinus through the needle. For hemophilia transfusion is specific for the attack.

2. Chronic secondary anemia; frequently of great value. It is of no value in acute sepsis.

3. Acute primary anemia, such as acute leukemia; it is of no value.

4. Chronic primary anemia, such as pernicious anemia; of value, but only temporarily, and for variable lengths of time.

For pernicious anemia it is the most efficient method of treatment we have. Transfusion alone offers as much for pernicious anemia as splenectomy with or without

transfusion, and carries none of the dangers of splenectomy. It usually brings about a remission by crisis, whereas other remissions come about usually by lysis—that is, slowly.

Reaction rarely follows transfusion of whole undiluted blood in Kimpton's hands.

Reactions are very common after transfusion of citrated blood. Massive transfusions of citrated blood may be dangerous, for whereas the percentage may be low, the total quantity of citrate in massive transfusions may be considerable.

Wassermanns, especially of donor's blood, should be done when time allows.

Isoagglutination tests should always be done, best in laboratory, between fresh bloods. Stock sera may deteriorate.

Transfusion without these tests may cause deaths, and even with these tests Kimpton has twice seen agglutination, the tests having been carried out by trained men.

In other words, there are undoubtedly serum reactions that we as yet do not know tests for.

A rough but fairly accurate bedside test may be carried out as follows:

Donor's blood.

1. 2 to 3 drops + oxalate (½ per cent) or salt solution equals corpuscles.
2. 2 to 3 drops + distilled water equals serum.

Recipient's blood.

3. 2 to 3 drops + oxalate (½ per cent) or salt solution equals corpuscles.
4. 2 to 3 drops + distilled water equals serum.

The oxalate or salt solution keeps the corpuscles free.

The distilled water lakes the corpuscles and gives serum.

On a hanging drop slide.

One drop of number (1) is added to one drop of number (4).

This gives donor's corpuscles to recipient's serum.

This same with (2) and (3) gives donor's serum to recipient's corpuscles.

These are observed for from 20 to 30 minutes, with microscope or hand lens, for clumping. If marked, this may be seen with the naked eye.

Blood tests, Kimpton believes, are not necessary for new-born babies, as bloods are not usually grouped until the child is about two years old.

Reactions are more likely to follow repeated transfusions, especially after four to five transfusions have been done and whether with the same or different donors.

Kimpton understands that transfusions at the front are not being done when urgently needed because of difficulty in having blood tests carried out. He would never hesitate to do a transfusion under such circumstances, for many more patients will be saved by doing the transfusion without blood tests than will be saved by not doing transfusions with blood tests.

THE ANTENATAL TREATMENT OF CONGENITAL SYPHILIS WITH SALVARSAN.

In the *Glasgow Medical Journal* for February, 1918, FINDLAY reaches these conclusions:

1. Antenatal treatment with salvarsan, reenforced by mercury, is superior to that with mercury alone.

2. By this method not only is a larger proportion of the children healthy—various statistics record 100 per cent of healthy children—but it would seem that without further treatment the mother can continue to bear healthy infants.

3. It would seem advisable, in view of the above results, that all records of miscarriages and still-births should be kept, and those due to syphilis determined, when the syphilitic mothers could be treated with mercury and salvarsan, and the health of their future children almost certainly guaranteed.

HYPERPLASIA OF THE THYMUS GLAND TREATED BY X-RAYS.

BENJAMIN and LANGE in the *Archives of Pediatrics* for February, 1918, state that it is most interesting to note the rapid improvement under Roentgenotherapy. Beginning with the first treatment marked progress is usually noted. Shortly after the second treatment the cough has usually abated. With the improvement in symptoms goes a corresponding shrinkage in the size of the gland as shown by subsequent radiograms.

The parents were always cautioned about

relapses, which occur in a certain number of cases, and directed to return for treatment regardless of appearance of symptoms within six weeks of the last treatment. Three treatments are the usual number given.

In reviewing the clinical literature of the past five years one is struck by the small number of cases reported of this apparently common illness. Furthermore it will be noticed that most of the cases which do come into print have been of the fulminating type. It is altogether likely that the cases coming under this series represent earlier stages of the more severe kinds. In other words, were they to have had intercurrent infections while in the stage of hyperthymotism more urgent symptoms might have been noted. It is probable that the condition was remedied before further symptoms could develop. This condition is important enough to deserve more attention than has been given to it in the past. Early diagnosis and prompt therapy may be the means of eliminating most of the sudden deaths among infants and young children.

Dr. Lange outlines his method of treatment as follows: All of the children who were referred to the *x*-ray laboratory were first radiographed to confirm, if possible, the clinical diagnosis. To obtain trustworthy plates of these cases certain details of technique must be observed. Undoubtedly the difficulty experienced in some laboratories of establishing definite *x*-ray diagnoses of thymus enlargement has been due to a failure to observe these details of technique. Indeed, in many large clinics the great frequency of enlargement of the thymus glands in young children has been overlooked and in some instances even doubted. While a clinical diagnosis of thymic enlargement is not always difficult, yet it is never absolutely positive without *x*-ray confirmation. This *x*-ray confirmation, taken in conjunction with the startling results of *x*-ray therapy, emphasizes this condition as a distinct clinical entity and leads to the recognition of many cases which would be otherwise overlooked.

The child to be radiographed must be placed flat upon the back. There must be no tilting to either side. If there is the slightest lateral tilting there is produced upon the *x*-ray plate an asymmetry of the two halves of the chest and a "flopping" or displacement of the mediastinal and heart shadows to one or the other side. *X*-ray plates produced under such conditions are usually valueless as they cannot be accurately interpreted. It is not always easy to place very young infants symmetrically upon their backs, but repeated trials must be made until a plate is produced which shows the chest areas—that is, the distance from the midline of the spine to axillary borders of the ribs—to be equal on the right and left sides. Under these conditions enlargement of the upper mediastinal shadow, whether to the right or to the left of the midline, can be readily recognized. It is essential in the making of these radiographs of very young children that the exposures be almost instantaneous. The reasons are obvious.

In the series here presented the time of exposure varied from one-sixtieth to one-thirtieth of a second. Even with such short exposures it is not always possible to secure absolutely sharp contours on the plates. If the time exceeds one-thirtieth of a second there results an amount of blurring of the shadow contours which usually renders the interpretation inaccurate. A very soft *x*-ray tube should be used on this work as the delicate thymus tissue will fail to cast a shadow upon the *x*-ray plates if the quality of the *x*-ray employed be too hard or penetrating.

As previously stated the *x*-ray diagnosis of the *x*-ray employed be too hard or enlargement (usually a lateral enlargement) of the thymus shadow, which normally rests upon and is continuous with the heart shadow. Since the breadth of the upper mediastinal shadow varies normally with the age and general condition of the patient, and since it may vary from time to time even in the same patient, the *x*-ray diagnosis is not always easy or free from error. In one case, not included in this series, an apparently normal thymus shadow was

obtained when the child was quiet or sleeping, but during a restless crying spell the thymus shadow became greatly enlarged.

The *x*-ray shadows of congenital heart enlargements are often confused with thymic enlargements. In all cases in which the *x*-ray diagnosis seems doubtful an *x*-ray exposure was given as a therapeutic test, and this test has proven very reliable. It must be conceded, in this connection, that many symptomless and apparently healthy children may show an enlarged thymus upon the *x*-ray plate, and this fact has been illogically cited as evidence against the accuracy of the *x*-ray diagnosis and the value of *x*-ray treatment of thymic enlargements. An enlarged thymus in an apparently healthy child may be abnormal, although its ill effects may not be manifest until some added strain be put upon the heart or respiratory organs or until the resisting powers of the child be called upon to overcome an acute infection. Post-mortem evidence is not always conclusive in these cases, as a thymus enlarged *intra vitam* may collapse after the circulation is abolished, although such post-mortem findings have been cited as indicating inaccuracy in *x*-ray interpretation.

The *x*-ray therapy was carried out in this series of cases as follows: A Coolidge tube backing up a 9½-inch spark was employed. The rays were filtered through 4 millimeters of aluminum and a piece of thick leather. The target skin distance was approximately 9 inches. The routine exposure was 25 milliampereminutes. In mild cases a single dose given over the anterior surface of the chest proved efficient. In more urgent cases 50 milliampereminutes were administered at the first treatment, 25 anteriorly and 25 posteriorly. During the treatment the child was kept quiet by four sandbags, one placed across each arm and one across each leg. The interval between treatments was usually one week, unless the urgency of the symptoms suggested more frequent application. The treatments have proven entirely harmless to young children, and if the symptoms are very urgent a second dose may be given within a day or two after the first. In order to get results it is essential that the treatments be comparatively heavy and that they be repeated at sufficiently short intervals. The failure to administer full doses and to repeat them promptly has in very urgent cases led to fatalities under *x*-ray treatment. Such a distressing occurrence is fortunately uncommon, but when it does happen it casts a doubt upon the diagnosis or upon the efficiency of the *x*-ray therapy. To guard against sudden deaths before the full destructive effect of the *x*-ray upon the thymus gland has been elicited, all cases with urgent symptoms should be kept under close observation and the *x*-ray treatments should be pushed boldly.

In the average case improvement of symptoms has been noted within twenty-four to forty-eight hours after the *x*-ray treatment. It is possible, however, as shown by animal experimentation, to elicit changes in the thymus gland within eight hours after the *x*-ray exposure. Therefore the most urgent cases can be saved by this treatment.

1. 8.4 per cent cases show enlarged thymus.

2. Physical examination. History of symptoms is suggestive of diagnosis. *X*-ray examination is positive evidence.

3. *X*-ray treatment produces definite cures.

A STUDY OF ACUTE MERCURIC CHLORIDE INTOXICATIONS IN THE DOG, WITH SPECIAL REFERENCE TO THE KIDNEY INJURY.

In the *Journal of Experimental Medicine* of April 1, 1918, MacNider reports a research on this subject which in its third conclusion, at least, contradicts views hitherto held.

1. In the acute mercuric chloride intoxications which have been induced in dogs death has been due either to the shock associated with the severe mercury enteritis or to a delayed kidney injury.

2. The injury to the kidney has been constantly associated with the development of an acid intoxication.

3. The delayed kidney injury is not due to the action of the mercury as such during its elimination by this organ.

4. The manner in which mercuric chloride induces an acid intoxication is at present under investigation. The participation of the liver in the intoxication will be considered in this connection.

DIGITALIS IN AURICULAR FIBRILLATION.

In the *Journal of Pharmacology and Experimental Therapeutics* for March, 1918, CUSHNY sums up this question as follows:

1. Two different types of effects are seen in the mammalian heart under the action of the digitalis series.

A. In the normal heart digitalis causes slowing through stimulation of the inhibitory center in the medulla, and if this is eliminated, the dominant feature is an increase in the excitability which leads to the inception of independent rhythm in the auricle and ventricle, and later to discharge from different points of the same chamber, which culminate in fibrillation.

B. In the excised mammalian heart exhausted by prolonged perfusion with Ringer's solution, digitalis causes slowing and block which closely simulate that induced by inhibition in the normal heart, but which is not prevented by atropine and therefore arises from direct action on the heart. The pace-maker emits fewer impulses, and these are still further reduced owing to impaired conduction to the auricle from the Keith-Flack node and to the ventricle from the auricle. The auriculoventricular block becomes further developed, the ventricular beats become slower, and finally the chamber ceases in more or less complete systole without fibrillation.

2. In auricular fibrillation in man digitalis slows the pulse, and this is independent of the inhibitory mechanism, for it is not prevented by atropine. In the mammalian heart *in situ* when auricular fibrillation is induced, strophanthin finally arrests the irregularity of the ventricle, by impairing conduction, but the pulse is not slowed owing to the accelerated idioventricular rhythm induced by the drug. In auricular fibrillation induced in the perfused heart, strophanthin renders the ventricle regular through impaired auriculoventricular conduction and at the same time slows the rate.

3. The type A, inhibitory slowing, occurs in man and animals with normal cardiac rhythm. The type B, slowing through direct cardiac action, occurs in most cases of auricular fibrillation in man, in rare cases of normal rhythm in man, in the perfused mammalian heart, whether the normal rhythm is preserved or the auricle is fibrillating, and in the frog.

4. The primary cause of the type B in man and animals is the malnutrition of the heart; the auricular fibrillation merely favors its appearance by accentuating the fundamental cardiac malnutrition.

TREATMENT OF ORAL SEPSIS.

In the *British Medical Journal* of March 9, 1918, FISCHER says that in his opinion the original focus of severe types of oral sepsis is at the margin of the gums and teeth. Mastication forces food in between the teeth, and between the gums and teeth. This food sets up a certain amount of irritation, and forms a suitable nidus for various organisms. The first problem is how to prevent food lodging in these sites; this can be solved only by efficient cleansing with a brush, which must be fairly stiff, and used after each meal in conjunction with a powder. Fischer has found the following excellent: Magnesii carbonas ponderosus, 3 parts; sulphur sublimat., sapo Castil., ää 1 part; ol. menth. pip., q. s.

If gingivitis or pyorrhea has already commenced, the affected area should be firmly swabbed with a small tightly rolled pledget of wool held in a pincette and dipped in liq. cresol saponis or any of its substitutes, taking care to remove the excess before using. A tumbler of warm water and spittoon should be ready to use immediately after. A thymol mouth-wash should be prescribed.

This method, Fischer ventures to predict,

will come as a revelation to all who have labored for weeks and months with iodine, hydrogen peroxide, and other methods, as it is so rapid in its effects; only in very advanced cases has Fischer found it necessary to apply the liq. cresol saponis twice, and rarely three times, at two-day intervals.

In severe cases of pyorrhea there is a dirty grayish-brown sloughing appearance at the gum margins, often jumping to the adjacent buccal mucous membrane; all these sites should be firmly swabbed, although the surfaces bleed in the process.

A similar condition is sometimes seen on the surface of the tonsils, and should be treated in a similar way; a sponge on a holder may be necessary here, dipped in sterile water or any mild antiseptic, if the person is too young or unable from any other reason to gargle. In septic conditions of tonsils and the back of the throat the ordinary chlorine gargle or swab should be applied every three hours after the initial swab with liq. cresol saponis.

A very septic socket may develop after extraction of a tooth, causing days and sometimes weeks of pain; if a swab soaked in liq. cresol saponis is firmly pushed into the socket, the relief is almost instantaneous, and a second swabbing after twenty-four or forty-eight hours is rarely necessary.

The pain inflicted in swabbing gums is practically negligible, but may be rather severe in the case of sockets.

LUMBAR PUNCTURE FOR OBSTINATE HEADACHE.

It has long been known that severe headache results in many cases from increased intracranial pressure. Instances have been recorded in which relief from such headaches has occurred after the spontaneous discharge of cerebrospinal fluid from the nose or from the ears, or from both. Hence it is not unnatural to suppose that severe recurrent headache may in some cases be due to sudden increase of the pressure of the cerebrospinal fluid, whatever the cause of this increase may be, and that lumbar puncture should relieve such headaches. Professor Mingazzini, of Rome, has recently published an account of forty-seven patients treated on these lines. All these patients had more or less permanent or continuous headaches not relieved by the ordinary methods of medical treatment; six were men, forty-one women. Cases with tuberculosis, syphilis, granular kidney, chronic alcoholism or excessive tobacco smoking, epilepsy, and intracranial tumors, were excluded from this series of patients. In every case the cerebrospinal fluid withdrawn was found to be normal on examination, free from globulin, and contained only a few lymphocytes. As a rule, the lumbar puncture made the headache worse for a few days, but a definite cure was obtained in twenty-four cases and a considerable improvement in fifteen more. No benefit resulted in the remaining eight. One patient, a woman of sixty, who had frequent headaches since her youth and daily for the preceding six months, was cured by a single lumbar puncture; another patient, a girl of twenty-two, who had headaches for two years, after typhoid fever, received no benefit from the puncture.

It was noted that if the pressure of the cerebrospinal fluid was normal or low, lumbar puncture failed to relieve the headache; it was successful where the pressure was found to be high. The results seem independent of the quantity of fluid withdrawn; thus no improvement might follow the removal of 15, 20, or even 30 Cc., while cure might follow the withdrawal of 10 or even 5 Cc. Analysis of the histories of the patients seemed to show that the treatment acted best in cases in which the headaches had begun at the age of ten or twenty, and had later become permanent for no appreciable cause.

The patients not improved by the puncture were those in whom the headache had been permanent from the outset, or had begun later in life and become permanent after lactation or the onset of some illness, or was associated with a neurosis, such as trigeminal neuralgia or epilepsy. The pathology of these headaches Professor Mingazzini leaves, as he found it, obscure. They

are thought to depend on increase in the quantity and pressure of the cerebrospinal fluid, due to some upset in the balance between secretion and absorption. Some connection between the choroid plexuses, the main secretors of the fluid, and glands with internal secretions, such as the ovaries or testes, has been thought to exist; this would explain, in part, the frequency of monthly headaches in women and the general tendency of headaches to grow less with advancing years.—*British Medical Journal*, March 9, 1918.

RECTAL ANESTHESIA.

GOHEEN in the *Indian Medical Gazette* for January, 1917, reports 82 cases anesthetized by the use of ether given by the rectum.

Forty of these patients suffered from tuberculosis, mostly glands of the neck, the majority requiring long operations for a thorough eradication of the disease. In some the lungs were affected. It was desirable to irritate the latter as little as possible, and it was distinctly observed that with rectal anesthesia bronchial irritation was less than with ether inhalation—by the open method as Goheen is accustomed to use it.

Ether, being less toxic than chloroform, is considered the anesthetic of choice for these lung operations in debilitated patients.

It is found that about as much, perhaps a trifle less, ether is used when given per rectum as by inhalation, in long operations.

Postoperative vomiting was somewhat less frequent after use of the rectal method.

In these two series, totaling 82 operations, five deaths are recorded, or about 6 per cent. This is a much higher mortality than is shown in Goheen's records of the past two years for the total of 872 major operations (of which 347 were abdominal sections), the percentage of fatalities being 3.4. However, it is difficult to prove that the method of anesthesia is to blame for the difference. Prolonged operations about the head and neck, especially in patients weakened by chronic disease, must be considered somewhat worse risk than the average for major surgery. If the two cases in the first series be excluded, the death-rate in the 82 tabulated operations stands at 3.75 per cent.

THE METHOD OF GIVING ETHER BY RECTUM.

I. Weigh the patient.

II. Clear the bowels by cathartics and a saline enema.

III. Give, hypodermically, morphine grain 1/6 and atropine grain 1/150, one-half to one hour before operation.

IV. (Instead of III.) Induce primary anesthesia by chloroform inhalation and proceed at once with:

V. (1) ℞

Ether, 3 parts.
Olive oil, 1 part.

Mix, and let there be a quantity sufficient to give one ounce of the mixture for every 20 pounds weight of the patient.

Shake thoroughly in a stoppered bottle for one minute; then introduce into rectum through a small oiled catheter, having a funnel, at the rate of 1 ounce per minute (patient's hips being preferably slightly raised) until entire quantity is given. Withdraw the catheter forthwith and maintain pressure on the anus with a firmly rolled bandage.

(2) For delayed anesthesia, say more than twenty minutes (when procedure III is used instead of IV), place a wet towel over face, or give more ether or chloroform by inhalation.

(3) For prolonged or deepening anesthesia after some time it will generally be necessary to give another ounce or so of the mixture by rectum, or to give a little ether or chloroform by inhalation.

(4) For overdose, lower the hips (if raised) and draw off the mixture from the rectum with a rectal tube having several openings. This mixture may be saved for reintroduction in the same patient when the danger has passed.

(5) For cessation of anesthesia, proceed as in (4). In addition it may be best to wash out the lower bowel with one pint of soapy water.

Note.—The ether-oil mixture is not irritating, if given as stated. In fact it can

be given to a patient in his or her bed by the nurse (if procedure III has been followed), and the patient becomes anesthetized without realizing that he or she is being given anesthetic. The method is thus well-nigh ideal for cases with hyperthyroidism, or other nervous patients. Except in such cases, Goheen prefers to begin anesthesia by chloroform inhalation (procedure IV), as this saves time—an important factor not infrequently.

Rectal ether has proved, in the 82 operations for which Goheen has used it, a safe and satisfactory method of general anesthesia, when intestinal lesion cases are excluded.

It is not suitable for laparotomies.

It is particularly convenient for surgery of the mouth, head, neck, or other regions above the diaphragm.

It is economical for operations that can be performed in less than thirty minutes.

It is almost ideal for nervous thyroid cases, or others who dread inhalation anesthesia.

There is less hyperemia about the head and neck, consequently less hemorrhage with this method.

It is less irritating to the lungs than is ether given by the open method, probably because it reaches the lungs in a naturally warmed and dilute condition.

There is less postoperative nausea and vomiting than with inhalation anesthesia.

TWILIGHT SLEEP: ITS ADVANTAGES AND DISADVANTAGES.

At a meeting of the Hunterian Society of London we learn from the *Lancet* of March 16, 1918, that Blacker opened a discussion on twilight sleep. After detailing the technique, as described by Krönig and Gauss, Blacker thought it might be admitted that scopolamine narcosis was capable of producing complete or partial amnesia in some three-quarters of all suitable cases if carried out with proper technique. The effects on the organs of the body, on uterine contraction, the course of the puerperium, and ability to suckle were considered in turn, and finally the effect on the child. Blacker then went on to summarize the results recorded by various observers, and the report of the committee to the Obstetrical Section of the Royal Society of Medicine. He said that he had purposely dwelt more on the drawbacks and dangers of the method, since the encomiums passed upon twilight sleep by some of those who took part in the discussion following the report might leave the impression that the method was free from any possible objection. The delivery of a patient in a condition of twilight sleep, Blacker concluded, required a considerable amount of experience and obstetric skill to carry out successfully, and on the whole the disadvantages of the method must be held to outweigh the advantages.

The President complimented Blacker on the able résumé and the fair way in which he balanced the arguments.

Routh said his impression was that the routine and technique of twilight sleep were adopted far too much as a general routine. There must be many contraindications, while there may be many suitable cases. Routh thought it was less serviceable in primiparæ on account of the prolongation of the second stage, and production of uterine inertia. It was most useful in highly strung women who would not otherwise face the pains of childbirth.

Spencer said that he regarded twilight sleep, "painless labor" as it is falsely called, as a cruel and dangerous fraud on mothers and babies. "It is," he continued, "a fraud to speak of painless labor in a woman who cries out and gives every sign of suffering acute physical pain although she may forget it afterwards, in a woman who may have had horrid nightmare and become maniacal and, therefore, needs constant watching in order that she may not do herself injury. It is dangerous to give such drugs as scopolamine and morphine, which, moreover, require in a large proportion of cases the administration of inhalation anesthesia, often given to the dangerous surgical degree; these drugs weaken the uterine contractions, as is shown by the

need of frequent use of pituitrin and forceps, which again increase the danger of labor to both mother and child. It has been asserted by the advocates of twilight sleep that there is no increased danger, and they have tried to support their statements by statistics which not only are mutually destructive, but often bear their untruth on the surface. What would be more misleading than the latest statistical statement of Siegel from the Freiburg clinic, the cradle of twilight sleep, that '5000-6000 mothers' have been delivered without a single death?—a statement which, unless dangerous and difficult cases have been excluded, will not be accepted by any obstetrician as having the slightest statistical value. The inherent dangers of scopolamine and morphine (or pantopon or narcophine, for the drug is constantly changing), the frequent use of forceps, and the occurrence in the child of 'oligopnea,' apnea, or asphyxia in about one-third of the cases, must of necessity increase the dangers both for the mothers and children.

"I showed more than twenty-five years ago the dangers to the child of delivery by forceps, and the dangers to the mother's subsequent health of forceps, used with the frequency with which some advocates of twilight sleep employ it, are very great. Such a frequent use is a very retrograde move in midwifery practice. In the first stage of labor there are obstetrical, social, domestic, and hygienic advantages in the patient's walking about, resting at times in a high easy chair. Bromides, chloral, and opium (which is much better than morphine), and in the second stage light chloroform anesthesia during the pains, are much better and less dangerous means of relieving the pains of labor than scopolamine and morphine. Instead of deceiving the patient by speaking of 'painless' labor, the honest thing is to tell her that she will feel the pains, but usually will not remember them afterwards, and to obtain such comfort as this she will run some extra risk to herself and her child. The oblivion of labor-pains claimed for scopolamine and morphine has been bountifully granted to women by nature as finely expressed in the Gospel of St. John: 'A woman when she is in travail hath sorrow because her hour is come; but as soon as she is delivered of the child she remembereth no longer her anguish, for joy that a man is born into the world.' The advocates of twilight sleep take away her joy for fear she should remember her anguish, remove her new-born babe in order that she may not 'reconstruct' the labor when she hears its cry, the sweetest music to a mother's ear."

Fairbairn, as a member of the committee appointed by the Royal Society of Medicine to report on the subject of twilight sleep, said twilight sleep was made in Germany and boomed in America, and was being thrust by the public upon the medical profession. The great objection to its general adoption, he urged, was the demand made on the practitioner. He had not had any bad results; every woman reacted differently to the hyoscine. The condition was like intoxication rather than sleep—that of the man who has had a row in a "pub" and wakes up in the police cell with a blank memory. This was due to the difficulty in standardizing the dose. Greenwood, he added, had shown that many of these effects could be obviated by standardizing the dose for each woman. Twilight sleep had been tried at St. Thomas's Hospital for some time, and the nurses came to the conclusion that the women had a worse time when it was left off. In long and exhausting labors he considered that twilight sleep allowed the head to become molded, and often low-forceps delivery was possible instead of high. But the cases must have two nurses and a doctor in constant attendance owing to the possible accompaniment of delirium.

Cripps quoted a case of a lady, forty-two, fourth pregnancy, ¼ grain morphine, 2-inch os, 1/100 grain scopolamine. Went home and visited again in two hours; still quite quiet and comfortable; gave another injection of scopolamine, and she was delivered in three or four pains after a quick labor. This was his only experience and it was a very successful case. He had to use chlo-

roform in the second stage owing to the rapid progress of the labor.

Currie asked if scopolamine and hyoscine are identical—he thought not. The former was an allotrope of hyoscine and much safer to use. He preferred ergot and chloral, as advised by Playfair.

Blacker said he objected to the lay "boom" and the frequent use of these dangerous drugs by unqualified persons. Most of the statements advocating twilight sleep were untrue. He had no objection to scopolamine-morphine narcosis in proper hands, but it was not without risks, and those behind the "boom" were always silent touching those risks.

THE LAW OF THE HEART.

The *British Medical Journal* of January 26, 1918, calls attention to Professor Starling's important Linacre Lecture on the "Law of the Heart," which gives an account of his recent researches, and thus differs from the retrospective essays of Sir William Osler and Dr. Norman Moore, two masters of medical history. He discusses the mechanism by which the heart muscle adapts itself to the variations in the work imposed upon it by its alterations in blood-pressure. By means of an ingenious arrangement the isolated "heart-lung preparation" of a dog is provided with an artificial peripheral circulation in which all the mechanical conditions of the heart can be controlled. Two important conclusions are thus at once established: that, provided the inflow of blood remains constant, it is immaterial to the heart what plood-pressure within physiological limits (44 to 200 mm. Hg) it has to contend with; and the more the blood-pressure rises, the greater the quantity of blood that passes through the coronary arteries—in other words, the more work the heart has to do, the better its blood supply. The heart has a wonderful power of adjusting not only its output of mechanical energy, but also its total chemical changes, to the work occasioned by the mechanical conditions of the circulation. When as the result of exercise the heart receives a larger quantity of blood and has a higher blood-pressure opposed to it, temporary dilatation with lengthening of the muscle fibers follows. The change in the muscle fibers brings more active surfaces into play, and this increase in the extent of active surface increases the energy of the heart muscle. At the same time more blood passes into the coronary arteries. The tone of the healthy heart is thus soon restored, and the organ returns to its normal volume, although it is doing more work. In a diseased or fatigued heart, on the other hand, the organ remains dilated during the whole period of increased work, and if the work is prolonged the dilatation may become permanent, and eventually cardiac failure may result.

The important deduction as to the connection between the length of the muscle fibers and the energy of the heart's contraction justifies the labors of past physiologists on muscle-nerve preparations, the practical application of which was entirely obscure at the time, and in the lecturer's closing words shows that this, like every advance achieved in the quest of pure knowledge, will sooner or later play its part in the service of man.

THE STERILIZING OF HYPODERMIC SYRINGES.

In the *British Medical Journal* of January 26, 1918, H. L. Smith tells us that in searching for a simpler and more convenient method of sterilizing syringes he made tests with a compound consisting of lysol, ether, and methylated spirit:

> Lysol, min. xv;
> Etheri sulph., drachm ij;
> Methylated spirit, q.s. ad oz. j.

Ether was used as one of the diluents to enable the lysol more readily to penetrate oil or fatty particles which might have obtained access to the interior of the syringes, and alcohol to prevent rusting of the needles. Smith has used this method of sterilizing syringes several hundred times in giving hypodermic injections without a trace of inflammation at the site of the

puncture. An ounce bottle of this solution does not take up much room, or may be stowed away in the waistcoat pocket.

Smith has found it useful and thoroughly trustworthy for sterilizing the skin before taking the blood from a vein for culture tests. Its penetration is superior to the tincture of iodine, and it does not irritate delicate skins if it is only left on a very short time—for example, ten seconds. Smith then swabs over the area with plain methylated spirit to prevent any chance of vesicating by the lysol. Surgeons therefore should find it useful to have in their emergency bags for rapidly sterilizing instruments, skin of patients, or their own finger-nails if without their aseptic kits and rubber gloves.

GONORRHEA IN YOUNG MALE CHILDREN.

BIEBERBACH (*Boston Medical and Surgical Journal*, Feb. 21, 1918) reports cases that demonstrate that it is possible for a male child of a very young age to be infected by either direct or indirect contact. He notes two brothers aged respectively six and three, who probably contracted the disease from an older sister; also a boy of four in another family. Treatment was by protargol solution introduced into the bladder by means of a small catheter when the entire urethra was involved. In one case potassium permanganate was used in increasing strength, followed by silver nitrate, reducing down to 1:4000. All recovered.

AN UNDISTURBED TREAD OPERATION FOR BUNIONS.

ALLEN (*Indianapolis Medical Journal*, April, 1918) observes that in the usual bunion operation there are three important features: First, the shape and location of the skin flap; second, the amount and disposition of the fascial flap; and third, the shape of the unexcised portion of the first metatarsal bone.

The usual skin flap is both conventional and highly commendable.

The fascial flap with its free distal end should be sufficiently long and broad to cover the cancellous tissue resulting from the excision of a portion of the head of the bone, and may advantageously be so designed as to draw down the tendinous sheath of the extensor tendon and should be secured by having one or more sutures passing from its distal end out through the skin, where the sutures are tied over a piece of sterile gauze lying between the first and second toes.

The entire head of the bone should not be excised, but a portion of the head should be excised in the following manner and for the following purpose:

More of the superior and internal portion of the head of the bone should be removed than of the external and inferior portion. If an ordinary curved bone is properly used a concave stump of bone may be spooned out, leaving the external and inferior portion of the bone longer than the internal and superior portion.

This is done for the following reason, namely, to preserve the normal tread of the foot, undisturbed by surgical procedures permitting the body weight to be transmitted through the projecting end of the metatarsal bone that has not been excised down through the sesamoids, which in turn rest upon the fat and fascia interposed between the skin and the foundation upon which the sole of the foot is to rest.

If the usual procedure of excising the entire head of the metatarsal bone is followed the anterior disposition of the body weight must drive the sharp, right-angled, almost cutting, decapitated margin of bone directly down upon either the posterior portion of the two sesamoid bones or upon the tendon in which they lie, producing the pain so constantly observed after the usual bunion operation. After decapitation one should not be surprised by the presence of pain, since pain cannot be avoided. Consequently it seems reasonable and has been found most practicable not to disturb the tread of the foot; therefore the distal end of the metatarsal should extend forward sufficiently to cover the sesamoid bones.

THE ABSORPTION OF DRUGS AND POISONS FROM THE GENITAL TRACT.

MACHT (*Journal of Urology,* Vol. II, No. 1) in an experimental study of the subject, using apomorphine and testing absorption by the vomiting, characteristic of the drug in dogs, noticed that absorption from the bladder is extremely slow; while from the urethra it is marked and rapid. The absorption from the posterior urethra is more rapid than from the anterior.

His observations have distinct clinical value and are corroborated especially by those who, in the manipulations on the lower urinary tract, habitually make use of local anesthetics.

ACUTE INTUSSUSCEPTION OF INFANTS.

PORTER (*Archives of Pediatrics,* March, 1918) contributes an article on this subject in which he expresses the opinion that the diagnosis is, as a rule, extremely easy. He states that acute intestinal intussusception is not very rare during infancy, and that it occurs, for the most part, during the first eighteen months of life. When the intestine of an older child invaginates it is usually as a complication of an intraenteric polyp, or of a partially obstructed external band; or, rarely, it furnishes an example of chronic recurrent intussusception in which the obstruction is only partial.

The baby attacked is generally one that has been in perfect health except, perhaps, that it has been constipated. The onset is sudden and the act of invagination is usually marked by screaming, the best evidence we have that the child is suffering intense pain. Such an accession of pain lasts but a short time, but may recur at longer or shorter intervals for one or two hours, when it gives way to urgent restlessness for a time before the child passes into a state of abdominal shock whereof the aspect is alarming. The features of this state of shock as it supervenes in this condition are extreme pallor of the face, some cyanosis of the lips, a rapid, weak pulse, lassitude and apathy, or even stupor. The pallor is most striking, and in every case the author has seen the mother has commented on the deadly chalky-white color of the baby's skin. Although the child lies without interest in its surroundings, with its muscles all flaccid, it screams with pain on the slightest movement of its body.

In the past ten years in hospital and private practice 32 cases of bowel obstruction have been personally encountered by Dr. Porter; of these 11 were instances of acute intussusception, of which 5 died. They were seen respectively on the 4th, 5th, 5th, 7th, and 5th day after the onset of symptoms, which in every case was sudden; with shock following an attack of pain and screaming. In all the fatal cases diagnosis had been overlooked and purgatives had been given. Of the cases that recovered, three were seen and operated within twenty-four hours; one within forty-eight hours—this one reduced spontaneously under manipulation; there was one chronic recurrent case of long duration with incomplete obstruction which was easily reduced by milking and traction, for there was little engorgement and swelling of the gut; and finally one example of extreme strangulation, first seen on the third day after the onset, reduced by the modified Hirschsprung technique. In searching the literature, one finds that it is very rare for cases of acute intussusception which have endured for more than thirty-six hours to recover, and if a high loop of the intestine is involved a delay of more than twenty-four hours is generally fatal.

The operation for the relief of intussusception if undertaken in time is simple, and usually it is not difficult to disengage the invaginated bowel. This is commonly done by encircling the mass with the hand and by exerting an intermittent, firm pressure in the oral direction; thus the engorgement and edema are relieved, and the gut disentangled. This maneuver accompanied by very gentle traction will frequently be successful within a few minutes, but it is more certain to result well if hydrostatic pressure is also used.

Unfortunately few cases of intussusception come to the physician's hands within the first twenty-four hours of obstruction, and a case of longer duration will rarely give way to this manipulation; in these circumstances traction, even of the gentlest kind, is dangerous, as the bowel has been long enough strangulated to become soft and to tear readily. Furthermore, the edema and engorgement are too great for relief to be obtained in this way. In such circumstances the usual recourse is to resection. This operation has been successfully done, even at so early an age as twelve days, but the general experience is that a large proportion of the babies whose intestines are resected die.

Although the ordinary procedure, both in Europe and America, is to resect the bowel that has been invaginated for more than forty-eight hours, vigorous objection to this procedure is made by the Danish clinicians Koch and Oerum, who are enthusiastic in their advocacy of bloodless reposition, first advised by Hirschsprung and practiced by him in the General Hospital at Copenhagen. They go so far as to say that the longer the interval between the accident of invagination and the possibility of relief, the more reason to avoid surgical procedure and to attempt bloodless reposition. They justify this position because of the frightful mortality that has followed resection of the infant intestine. Their observations, based upon a very rich material, seem to justify the contention. The cases included in their report comprise those originally described by Hirschsprung as well as a large number which have fallen under their own observation, and which have been treated by the Hirschsprung method, 400 in all, many of them of several days' duration. The percentage of their cures (85 per cent) is much higher than that of any other observer. This is especially true of recoveries in neglected cases.

The success of this procedure depends upon a thorough adherence to the Hirschsprung technique, which is done without any opening of the abdomen. It demands that the child be deeply narcotized, that the hips be well elevated, that a careful determination be made of the oral and aboral ends of the intussusception, and that intermittent pressure from the aboral toward the oral end of the tumor mass be made gently but firmly for a few minutes. This pressure is to be followed by the introduction of water at about 100° with a pressure head of about 25 to 35 inches. The introduced water is siphoned off and pressure and succussion again applied. The two procedures are alternated until the evidence testifies that reduction has been accomplished. In the experience of the two Danish observers, the attempts frequently result in successful reposition without an opening of the abdomen. The Danes lay stress on the necessity of keeping the child under close observation for some time in order to determine the very earliest signs either of failure to obtain a complete reduction or of a recurrence.

Porter proposes to supplement this procedure and make it more efficient by opening the abdomen and handling the gut directly. He reports a successful case.

BLOOD TRANSFUSION.

AMEUILLE (*Bulletin de l'Académie de Médecine,* Feb. 12, 1918) notes that the ideal method in blood transfusion is to collect the blood of the donor through a needle and inject it similarly in the recipient, thus avoiding any incisions or serious vascular injury. With Queyrat's needle, 300 to 500 mils of blood can be withdrawn from the veins at the bend of the elbow in a normal subject. The puncture with Queyrat's needle causes but little pain and cannot give trouble in any way. The blood as it runs out is collected in a sterile receptacle containing about 0.1 gramme of sodium citrate for each 100 mils of blood to be withdrawn. Enough water will be present in the receptacle if the citrate is merely dropped in it in the dry state and the receptacle then sterilized in the autoclave. The receptacle should be continuously shaken while the blood is dropping into it. The blood is then

injected in the recipient from a wash bottle connected with a rubber bulb as though an intravenous saline injection were being given.

By this method the blood can be kept—at 37° C.—as long as four days without harm to the recipient. At the front the author found it feasible to provide for emergencies by keeping several bottles of citrated blood in the incubator. With so easy and harmless a method donors are easily found, and a single donor can without inconvenience supply additional blood two or three weeks after the first withdrawal. As the blood can be kept for a time, it can be carefully watched to make sure that it does not undergo spontaneous hemolysis. Time is also given for carrying out a Wassermann test with it in the case of a suspected donor. The entire procedure of transfusion is so facilitated that it becomes available not only for posthemorrhagic anemias, but also for certain medical anemias and even for infections or dyscrasic states.

THE HEMAGGLUTININ REACTION.

Bond (*British Medical Journal,* March 2, 1918) as the result of a study of this question reaches the following conclusions:

In a considerable number of cases, under conditions which require further analysis, but which seem to be associated with recovery from albuminuria in the nephritis cases, and successful resistance to general infection in the wound cases, a definite alteration has been found to occur in the blood serum, for the most part in the direction of an increased hemagglutinin content. The bearing of this fact on the problem of blood transfusion now becomes apparent. If the blood serum of a recipient may be at one time compatible with the red cells of a given donor, and at another time may agglutinate those cells, the donor's serum may also, as the result of recovery from infection or other illness, change in the same way.

Cases have been recorded by Major Robertson, Major Lee, and others in which transfusion of blood from the same donor to the same recipient had no harmful effects on one occasion, but was followed by death on a second. The author suggests that changes in the hemagglutinin, and probably in the hemolysis, content of the blood serum of the recipient or donor, or both, occurred in the interval between the two transfusions, which were responsible for the unfortunate result.

THE ABORTIVE TREATMENT OF GONORRHEA IN THE MALE.

Bierhoff (*American Medicine,* March, 1918) thus describes his application of the abortive treatment of gonorrhea:

The case must not be one of first infection.

We must feel reasonably sure that we are dealing with a fresh infection.

The interval between infection and the beginning of treatment must not be too long, preferably not over one week.

The onset of the disease must not be of the virulent type.

The gonococci must, in great part, still be extracellular.

We must be prepared that some among the cases (although the percentage is, happily, small) may show themselves to be hypersensitive to the silver salts, and that, furthermore, there are others in whom, before the beginning of the treatment, the infection will have extended to and have involved the urethral glands, or crypts, or the prostate. Naturally, such conditions should not be used as arguments against the abortive treatment.

If we bear the above facts in mind, we may hope to cure a large majority of the cases quickly and definitely. This is not possible, however, if we employ the astringent drugs during the gonococcal stage of the disease; for, by their use, we delay the cure by promoting the retention of the germs in the tissues.

Daily control examinations are necessary in order to judge correctly the progress of the cases and to change the treatment

with reference thereto. A sufficient knowledge of microscopic technique and of the morphology of the gonococcus is, therefore, absolutely essential if one wishes to succeed with this form of treatment.

The method is applied as follows: The secretion is taken from within the urethra by means of a sterile platinum loop, and at once examined under the microscope. The patient is then instructed to pass his urine in two portions, of which the first contains all but a few drachms, the rest being passed into a second glass. Should the examination of the discharge and the inspection of the urine show that the case is one that offers us the possibility of success, then we irrigate the anterior urethra only, by means of the large hand syringe or irrigator, with 450 Cc. of ½-per-cent solution of protargol. Care should be taken to avoid any violence, and the irrigating fluid is not intended to flush out the posterior urethra or bladder, although no harm results if a small quantity does find its way there. The physician then, by means of the 8-Cc. urethral syringe, demonstrates upon the patient the correct method of injecting himself, and orders him to do so every four hours, with the small syringeful of ½-per-cent protargol solution, containing in addition 15 per cent of glycerin. He is ordered to urinate before making the injections, and to hold the solution for ten minutes in the urethra.

If the result is to be a positive one, then, on examination after twenty-four hours of treatment, the urethral secretion will be found to be a mere trace, and aseptic. Should the secretion be taken after injection, and before urination, it will be found aseptic, and to consist chiefly of degenerated pus cells, with epithelia and fibrin threads. Should he now urinate, and we examine after an interval, without further injection, we shall find the sparse secretion to consist almost exclusively of epithelia, with but few degenerated pus cells.

The treatment of the first day is repeated on the second. He then advises the patient to present himself, on the third day, without having injected that morning, and from two to three hours after urination. In successful cases he should now be free of discharge or gonococci, and the urethral scraping be almost exclusively epithelial.

Upon this third day the author irrigates with 300 Cc. of a ¼-per-cent solution and advises the patient to inject himself three times during that day. Should he be free of gonococci on the fourth day, then he omits the irrigation and the patient injects himself in the morning and evening only. Naturally, scrapings are made daily, and shreds examined if no scrapings can be obtained. On the fifth day the injections also are omitted, and the patient instructed to proceed to the alcohol test, in moderation. This is repeated daily for a week, after which, if still free of germs, he is permitted to indulge in coitus condomatus. Should this prove negative, then we are justified—according to the author's experience—in considering the case aborted; for it has been the writer's experience that, if gonococci be still present somewhere in the tissue, they will almost without exception reappear, with discharge, within forty-eight to seventy-two hours following the cessation of local treatment.

The only dietary restrictions which the author has found necessary during this treatment are the avoidance of highly spiced foods and alcoholics. Sexual excitement must, of course, also be strictly prohibited.

Should the gonococci not have entirely disappeared after forty-eight hours of treatment, then the writer considers the abortive treatment to have failed—for he cannot consider a treatment as abortive which does not rid the patient of his infection within that time. In such cases he then proceeds to the usual treatment of the disease. This differs but little, in reality, from the foregoing, excepting that we do not see the patient so often.

Should the urethral glands, paraurethral passages, or crypts be infected, then we usually notice that the germs disappear at first, to reappear on the fourth or fifth day. If the prostate be involved, we find that the gonococci persist, the second urine

becomes cloudy, and we find gonococci in the prostatic secretion.

In rare cases, symptoms of irritation of the urethra arise which are due to an individual idiosyncrasy of the patient to the drug in use. We may notice slight tingeing of the discharge with blood, accompanied by burning, on urination. The bleeding may, however, be more pronounced, and accompanied by slight diminution in the stream of urine. This is usually due to the preëxistence of a stricture. He has also in rare instances seen an edema of the meatus, with eversion of the lips, accompanied by the free discharge of a serous or serosanguinolent fluid. These complications are happily of transient character, soon disappearing upon a temporary cessation of the treatment. After their disappearance we may continue the treatment with weaker solutions, and usually find that the urethra tolerates these well.

As to results, of a total of 363 cases, 63.6 per cent were free of gonococci after forty-eight hours of treatment, and of those resulting negatively more than one-half were free within three weeks. The percentage of infections of the prostate was 6.78. Epididymitis occurred in five cases and paraurethral abscess in two.

THE INTRA-ARTERIAL (VERTEBRAL) ADMINISTRATION OF TETANUS ANTITOXIN.

PRATT (*New York Medical Journal,* April 20, 1918) deems the following points worthy of consideration in connection with treatment:

There is a local site of injury at which, and limited to which, the Bacilli tetani are growing and producing toxins. There is a circulating hemolytic toxin, tetanolysin, absorbed from the site of injury by the way of the lymphatics, which can readily be neutralized by subcutaneous or the intravenous or intramuscular exhibition of antitetanic serum; this can be eliminated from the discussion of our present ineffectual methods of treatment. There is a non-circulating toxin, tetanospasmin, gaining access to the anterior or motor ganglionic cells of the cord and the medulla—the central nervous system above the medulla being rarely involved—by means of axis cylinder processes of these cells, exhibiting definite election of motor to the complete exclusion of sensory cells, and producing definite structural alterations in them without, however, of necessity, causing their destruction; in truth the clinical picture of tetanus either acute or chronic, fatal or recovering, being incompatible with motor cell death, this toxin is inaccessible to our present methods of administering any neutralizing serum which we possess. There is a distribution of a certain amount of toxin by the blood to the peripheral nerve endings, whence it finds its way to the cord by means of axis cylinders.

Antitoxin neutralizes the toxin in a test-tube or, when combined with the toxin in the presence of living tissues, renders it inert. It is apparently harmless in very large doses. No serious ill effects are recorded following any of the different methods in use. Antitoxin, given subcutaneously, is absorbed very slowly. Notwithstanding this it has been extremely successful as a prophylactic in veterinary practice even in view of the marked susceptibility of the horse to the disease. Given intravenously it of course gains immediate access to the circulation, but allows only a fractional portion of the dose to reach the cord owing to its large dilution and possible chemical changes in transit. It is excreted in a large part unchanged in the urine, feces, milk, and other excretions and secretions. An infinitesimal portion is to be found in the cerebrospinal fluid. In the intraspinal method the flow is quickly toward the cranial subarachnoid space and thence into the venous circulation. Very little effect can be expected upon the cord tissue by this means of injection unless the nerve tissue could be bathed in fluid laden with antitoxin, over a considerable period of time, which is obviously impossible in this disease when the technical care necessary in spinal anesthesia is remembered. The in-

tracerebral and subarachnoid (cerebral) methods deserve no consideration.

The proposed treatment includes, first, prophylaxis according to present accepted standards. In the presence of acute tetanus remove the source of supply of toxin by excision of tissue at the site of injury and carry out this procedure radically, even to amputation. Block the flow of any toxin remaining by intraneural injection, not blindly, but having the nerve under direct view, to prevent access of the fluid to the cord. Intracaudal injections are uncertain and of doubtful value. It is very difficult there to inject into nerve trunks. The injections are worthless unless this precaution is observed. Neutralize the toxin in blood by large subcutaneous or intravenous injections repeated daily or oftener. Use the customary therapeutic measures—chloral, bromide, morphine, amyl nitrite, feeding, fluids, etc.—as symptomatic treatment.

The toxin located in the motor cells of the cord and medulla remains to be neutralized. For this purpose it is suggested that a large dose or doses be given directly into one or both vertebral arteries by puncture of this vessel during exposure under general anesthesia, as soon as a diagnosis can be made. The reasons for this method are as follows: (1) Proteins—toxins, alkaloids—when injected intra-arterially, become fixed in the cells in the capillary distribution of the artery employed. A good example of this is the immediate anesthesia produced in forearm and hand following injection of cocaine into the brachial. (2) The vertebral arteries furnish a large proportion of the blood to the spinal cord and medulla through the long descending anterior and posterior spinal arteries which are given off near the medulla. The remaining blood supply comes from very small cervical branches of the vertebral and spinal branches of intercostal, lumbar, and sacral vessels. While there is free anastomosis throughout the circle of Willis, it is nevertheless a fact that cocaine injected into the common carotid produces anesthesia of head and neck without medullary involvement, which would lead us to believe that there is fairly sharp demarcation between vertebral and carotid distribution. As tetanus involves practically only the cord and medulla, the arterial blood of the vertebral will reach directly the attacked cells. Material injected into one vertebral reaches the entire distribution of both.

It is recommended, then, that under general anesthesia the vertebral artery be exposed as follows: Make a curved incision over the angle formed by the posterior border of the sternomastoid muscle and clavicle, and retract this muscle inward; it is often necessary to cut a few of the outer clavicular fibers of the sternomastoid. Incise the deep fascia; locate the carotid tubercle; displace inward the jugular vein; define the space between the inner border of the scalenus anticus and longus coli, and find the vertebral artery by its pulsation. The vertebral vein lies directly in front of it. Avoid the pleura, the inferior thyroid vessels, the phrenic and sympathetic nerves, and on the left side the thoracic duct.

Then pass the fine slightly curved needle of the loaded syringe into the vessel upward and inject a relatively large dose of antitoxin slowly. Any oozing from the vessel after withdrawal of needle can be controlled by packing the wound, which will allow of subsequent injection if necessary If these later injections are indicated, and it is found from any cause to be impossible to give them into this vertebral artery, then the opposite one should be exposed. The wounds may be closed at any later time. This procedure is not technically too difficult to be practicable, it is certainly no more formidable than trephining and injecting into the brain, and under any circumstances it is justified in the present hopelessness of the great majority of cases.

This method of intra-arterial (vertebral) administration of antitoxin fulfills the theoretical pathologicophysiological requirements of reaching the heretofore inaccessible toxin in the cord and medulla. The antitoxin, arriving at the anterior cornual cells only slightly diluted, having been subjected

to a minimum possibility of alteration in the blood stream, and having evaded the pulmonary circuit, reaches as intimately the involved cells as does the toxin. This operation allows of the use of almost the entire amount injected for the purpose indicated through the fortunate limitation of the vertebral circulation to the parts involved; it is not too technical to be feasible, and so far as can be determined by analogy it should be as safe as any other of the methods in vogue.

PRIMARY SUTURE OF WOUNDS AT THE FRONT IN FRANCE.

Bowlby *(British Medical Journal,* March 23, 1918) after a résumé of the development of primary suture, observes that the year 1917 was a general acceptance of the proposition that union was, under favorable conditions, a reliable surgical fact, and notes that of 433 patients operated upon, 98 per cent of whom were injured by shells or bombs, in 67 per cent the wounds healed by first intention, while in a great many others they healed with slight surface suppuration.

Drummond and McNee's cases are cited showing that of 32 wounds closed at the time of operation, 30 healed per primam, and 10 others healed similarly which were left open for one or two days and then sutured, making a total of 40 successful closures out of 42 cases. These under the use of flavine, which Bowlby states is a useful agent in freshly excised wounds, but not serviceable as an application to granulating surfaces. Haycroft closed 116 wounds after treating with a solution of soap. Of these cases 75 healed per primam and 16 more after superficial suppuration. Thirty-eight of the cases were complicated by fractures of the long bones, and of these 28 healed per primam and 5 after superficial suppuration. After further study it is evident that those which heal per primam may do so in the presence of various organisms, provided that all dead tissue and all foreign bodies have been removed.

Fortunately, the clinical evidence as to how a wound is doing is generally easy to obtain. A slight rise of temperature often follows suture, especially if it is done after an interval of a day or two, but in the absence of other evidence of infection it is not a reason for opening up the wound. On the other hand, the surgeons have found that all the cases infected by hemolytic streptococci showed such definite evidence of infection within twenty-four hours that, apart from the report of the bacteriologist, it was clear that the wounds required to be opened up, for the skin edges were red, swollen, and indurated, and a copious exudation oozed from between the stitches. It is fortunate that such reliable evidence can be reckoned on, for it might be impossible to wait for a bacteriological report.

But if success is to be obtained it is necessary to take every precaution to insure it, and one most important precaution is the use of *x*-rays, for in many cases a foreign body will be left, unknown to the surgeon, unless a radiograph has been taken or a screen examination has been made before operation. It is not contended that this examination is invariably required in every slight case, or in through-and-through bullet wounds, but wounds are not always what they seem, and every precaution is worth considering.

The choice of suitable cases for suture demands a considerable experience of wounds at the front, and is not a matter to be lightly decided. We find that about half of the cases at present being admitted to our "observation casualty clearing station" are not suitable, and the experience of Surgeon-General Wallace gives the same proportion. Some are suffering too much from exposure, shock, or recent bleeding, to bear a prolonged operation. Some have too many wounds to allow operations to be done on all of them, while in others the destruction of skin by the missile is too extensive. Some wounds are already evidently inflamed, and others show either commencing cellulitis or gas gangrene. Not a few arrive after too long a time for closure to be safe, even if none of these conditions are present.

This brings us to the question of "time." A little consideration will show that no time rule can be laid down to apply to all cases. Thus, an open gutter wound involving only skin and subcutaneous tissue might be safely excised and treated twenty or thirty hours after its infliction, if it showed no signs of infection, whilst a man with a large wound and a fracture of the thigh who had been soaked in mud for a similar time would not be a safe subject for closure. A good deal also depends upon whether or no dangerous organisms have invaded even a superficial wound. But, allowing for these differences, it must still be said that the earlier the patients are operated upon the higher is the average of success in every class of wound. Delay means danger.

At the Allies' Surgical Conference in November, 1917, M. Duval reported that of the "lightly wounded" without fractures 80 per cent had been successfully sutured within eight to twelve hours of injury, and M. Tuffier informs us that equally good results were obtained in wounds not going as deep as the muscles even after twenty-four hours.

The French surgeons have called the suture which is done after the lapse of a day or two "la suture primitive retardee," and we have been in the habit of calling it "delayed primary suture," leaving the term "secondary suture" for the closure of granulating wound. It thus happens that a wound is often excised by one surgeon, and when the patient arrives at a hospital where he can remain at rest, sutured by another. Their observation at the front on the patients they have retained there entirely confirms the opinion of the French surgeons that there is no disadvantage in delaying suture for forty-eight hours or more. On the contrary, most surgeons with recent experience of excision and primary suture consider that there are many wounds which do much better if they are not closed at once. For, where there is extensive laceration or a bad fracture the oozing cannot always be stopped while the patient is on the operating table, and therefore it is not wise to close such a wound then and there. If twenty-four or forty-eight hours are allowed to elapse all oozing has ceased and suture is much more often successful than it otherwise would have been. Here also experience is required to know which wounds should be treated in one way and which in another, and much of the success obtained will depend on the decision.

It is also wise not to suture any wound at the time of excision if there is any material doubt as to whether suture should be done. It is much better to leave such a wound open till enough time has elapsed to settle the question. If drainage is required it should be insured by the insertion of a doubled piece of sterilized silver wire, and not by either drainage tubes or gauze; but the sooner the wound can be completely closed the less will be the chance of infection and suppuration. If a drainage tube is used and is left in long enough suppuration is assured.

But, while success depends on many conditions which are beyond the control of the surgeon, it depends very largely on the surgeon himself. Let it be clearly realized that primary suture of wounds is more likely to end in disaster than in benefit unless the operation is most carefully performed, and this implies, in the first place, the most minute aseptic precautions, such as are commonly practiced by British surgeons in their most serious operations in civil work. No more skin should be excised than is absolutely necessary; even if badly damaged it can often be saved. In the next place, the operation must be done most deliberately and thoroughly, so that no part of the wounded area escapes treatment. This all means a good deal more time than is required for the opening up and cleansing of the average infected wound which is not suitable for suture, but it is time well spent, especially if the case is one of fracture.

On the other hand, operation for the excision and cleansing of small superficial wounds can be done quite quickly, and no class benefits more than these by this method of treatment.

It is in the class of "slightly wounded,"

with injuries of the "soft parts," or "flesh wounds," that early and careful operation yields the highest proportion of success. Hitherto, when wounded are numerous, these patients have habitually been carefully dressed but not submitted to operation. Often many weeks or months have elapsed before their wounds have finally closed, and for all this time they have been inmates of hospitals and frequently confined to bed. Some of them have had serious complications as well. Successful suture makes a complete cure of such patients in a time measured by days or weeks instead of by months.

The benefit to the more seriously wounded is still more obvious. Not only are compound fractures converted into simple ones, but the period of confinement to bed and to hospital is greatly shortened. The absence of sepsis is well seen in the features of the patients, whose good color tells its own tale. There is none of the general loss of flesh, none of the shrunken and stiff, wooden-like limbs which we see after prolonged suppuration, none of the stiffness of all the joints of the affected limb which is so long in recovering.

Bowlby quotes statistics from three separate areas giving a total of 1202 cases under various surgeons, with success in about 70 per cent. Moreover, in the remaining 30 per cent there was a very early closure of the wound in spite of superficial suppuration.

The success obtained in cases of fracture is about 75 per cent. Bowlby concludes his article as follows:

The amputation cases at the observation hospital have been few, but they also have been very satisfactory. Of 11 cases all the patients have recovered. Seven were amputations through the thigh, two through the leg, and two were Symes. Ten out of the 11 healed soundly either after immediate suture or after closure of the flaps on the third or fourth day. One failed to unite, and suppurated.

Another very satisfactory result is that the whole number of the patients have, so far, recovered whose wounds were sutured at the observation hospital. There has as yet been no death in the 175 patients operated upon for suture, whether the latter was successful or not.

Sufficient care has now been exercised, and sufficient experience gained, to allow the primary suture of wounds to be placed on a definite footing, and to permit the following conclusions to be drawn:

The most important treatment is the careful cleansing of every part of the wound, and the subsequent complete excision of all dead, badly damaged, or grossly infected tissue. It is never necessary or right to remove more than a very thin edge of skin.

Complete asepsis is of the highest importance, and experience at the front is essential in order to select suitable cases.

The wound may be sutured at once, or may be left unclosed for one, two, three, or four days. It can then be sutured, with results which are identical with those obtained by immediate suture.

If after operation the wound is not sutured it should be dressed in such a way that it need not be disturbed until the time for closure has come.

If the wound is sutured at the time of operation, the patient should be retained in hospital for not less than a week. If he cannot be retained then the wound must not be sutured.

It is seldom that, even after the most careful operation, the wound is sterile, and bacteria can generally be found in the secretion on the following day. The presence of a few bacteria, whether anaerobes or the ordinary pyogenic forms, does not prevent healing of the wound. Streptococci which can hemolyze blood constitute the most dangerous form of infection, and if they are detected the sutures should at once be removed.

No definite rule can be laid down as to the lapse of time after which suture should not be done, but the sooner the wound can be operated upon the greater is the probability of success. It can be sutured later.

If the wound edges are found on exami-

nation to be already indurated and inflamed, or if definite gas gangrene has already commenced, the wound must not be closed. Whenever there is any doubt at all it is best to leave the wound open, knowing that it can be equally well sutured in a day or two if this appears advisable.

VARICOCELE AND ITS RELATION TO THE REGISTRANT'S ACCEPTANCE FOR MILITARY DUTY.

The *Indianapolis Medical Journal* for May, 1918, in a leading article quotes as follows from BLOODGOOD:

"We were set right in this matter after examining 4314 young men seeking employment as brakemen, firemen, switchmen, and others engaged in equally strenuous labor. In this number, 4314, we found 315 with varicocele in more or less marked degree, most of them such as we had operated on earlier. These men were between twenty and thirty years of age. A few wore suspensory bandages less because these were necessary than from the thought that they ought to wear them. As varicocele did not disqualify for railway service, none were operated on, or asked for or were advised to have an operation. These observations covered a period of twenty years, and not in a single instance have we found a disability arising from the presence of the varicocele or a suggestion for an operation.

"Within the last few months we have examined about five hundred young men for selective military service, and found the percentage of varicocele about the same as above stated. Therefore in 4800 men between the ages of twenty and thirty-one, with 350 cases of varicocele, we have not found one man who apparently needed an operation. On the contrary we have examined a considerable number of young men who had been operated on by more enterprising surgeons—a few of whom we had earlier contributed—with results far less satisfactory than where we had let them alone, observing a course which relieved them of their fear."

RADIUM TREATMENT OF SCARS.

STEVENSON *(Lancet,* March 23, 1918) as the result of a clinical trial thus concludes regarding radium:

Radium has a distinct sphere of usefulness in the treatment of scar tissue and fibrous adhesions.

It is a valuable adjunct to other methods of orthopedic treatment, especially by shortening their duration.

Its effect is rapid, sometimes immediate.

It softens and mobilizes scar tissue.

It appears to facilitate subsequent removal of the scar by the knife.

It enables structures, like tendons adherent to the scar, to free themselves.

By loosening tendons and stiff joints it improves the functional power of the part.

It possesses the advantage of acting, to some extent, as an innocuous local anesthetic for about a week.

It is particularly useful in treating scars and adhesions in the hands and fingers.

It is easily applied to the surface of the skin, and by this method causes no inconvenience to the patient.

To obtain the best results a single large dose is necessary.

The dose should not be so great as to produce inflammation of the skin.

With suitable dosage it appears to produce no ill effects.

In small doses it appears to hasten the healing of wounds, and to allay the painful inhibitory effects of the products of inflammation.

NON-UNION OF WAR FRACTURES OF THE MANDIBLE.

COLE *(Lancet,* March 30, 1918) summarizes the result of a considerable clinical experience as follows:

The results obtained by the operative treatment of non-union must be concisely summarized thus: 30 cases have been subjected to operation; in two cases the operation has been abandoned as impracticable.

Of the remaining 28 cases, 10 have been operated on too recently to permit of any definite statement as to the results obtained.

Of the 18 cases whose subsequent history is known the results have been completely successful in 13, two have been considerably improved, while the results in the other three must be regarded as failures. Thus it will be seen that the percentage of success is over 70. There has been no mortality and post-anesthetic complications have been entirely absent. In all but two cases ether has been administered by intratracheal insufflation, and the uneventful convalescence is entirely attributable to the skill exhibited in its administration by Dr. Francis Shipway and Mr. Ramsey Phillips.

The results are such, in a word, as to justify the conclusion that no patient so afflicted should be discharged until operation has not only been offered to him, but urged upon him. The functional disability associated with ununited fracture of the mandible is, in the vast majority of cases, an unnecessary disability. It is a blot upon the escutcheon of surgery which we, if we be worthy devotees of the art, must determine to expunge.

GUNSHOT WOUNDS OF THE ABDOMEN AT THE CASUALTY CLEARING STATION.

CHARLES (*British Medical Journal*, March 23, 1918) reports upon one hundred and fifty consecutive operations for penetrating abdominal wounds. He notes that the diagnosis of penetration may be difficult, and observes that the facial expression is usually one of anxiety and that pain is not of great value, and may or may not be present. At first the pain is often diffuse, and afterward becomes more localized, while various reflected pains are occasionally complained of—a wound in the hepatic region accompanied with pain in the right shoulder; a wound in the lower costal region, with pain and rigidity in the epigastrium, often without any involvement of the abdominal cavity.

Tenderness he regards as a very constant and reliable sign; that is the tenderness elicited on moderate pressure over the injured viscus. As to rigidity, he states that its presence or its absence is often exceedingly misleading, and that there may be a flaccid abdominal wall in a case of multiple perforations of the bowel. On the other hand, board-like rigidity is frequently met with in a purely parietal wound.

The pulse is of value from a prognostic standpoint, but the *x*-ray affords the most useful guide to the diagnosis of penetrating wounds of the abdomen. Without it there must often be a large element of doubt. When a case reaches the casualty clearing station in a dying condition nothing can be done, excepting to relieve pain and thirst.

Preoperative treatment consists in raising the body heat. For this purpose radiant electric bath is the best. Saline, two pints, with brandy, is given subcutaneously prior to and not during operation, as formerly practiced. For extreme cases intravenous saline with 3-per-cent sodium bicarbonate has lately been recommended, and is apparently more effective than the simple saline solution. Morphine is given for pain, and rest and absolute quiet are essential. It is advised to delay operation until the patient has recovered from shock, taking the risk of hemorrhage and peritonitis up to six hours. When the patient is warm, the operation is done at once. The anesthetic used is warm ether and oxygen given by Shipway's apparatus. The first essential of operation is speed, and if the operation is not completed inside of one hour the prognosis is not good. The patient must be kept warm. The abdomen is opened by a free paramedian, or in some cases a transverse, incision. The skin is covered with tetra towels wrung out of hot saline, and over these a sheet of oiled silk is placed. The bleeding points are attended to first as soon as they are encountered, and then a large swab is placed in the pouch of Douglas, and a systematic search made for injuries. The small intestine is examined first, and any perforation covered with gauze, clamped, and left outside the abdomen; uninjured gut is returned immediately, as far as possible. Wounds of the colon are then looked for and dealt with, or packed off and dealt

with later through a separate incision if needful. Wounds of the solid viscera can be felt. Wounds of the large gut are dealt with first. Thereafter soiled instruments and gloves are discarded for clean instruments and sterile gloves before proceeding to repair the small gut. End-to-end union takes less time, if done by a single invaginating suture, and this method obviates the need for a second layer, involving a further reduction of the lumen of the bowel.

Colon wounds are always closed by suture if possible, even risking the fecal fistula which occasionally follows suture and drainage, in preference to making an artificial anus.

After exposing the kidney the transverse incision is used. Complete removal is only done for gross destruction of torn vessels. The infected and damaged kidney is excised, the renal wound sutured and drainage down to it. The abdomen is closed by layer sutures, and in wounds of the small intestine operated upon within ten hours the abdomen may be closed with safety. As regards colon wounds, whenever possible free drainage was supplied, usually by rubber dam, direct to the site of suture. Retroperitoneal wounds of the colon are always very freely drained. The superficial wound is excised according to indications, no attempt being made to enter the abdomen by enlarging it. When the wound is in the back it is dealt with previous to performing laparotomy. As to abdominal thoracic injuries, respiratory distress is the outstanding feature on admission, often so severe as to preclude immediate operation. Morphine is given for pain and restlessness, and, when the wound in the thorax is a blowing one, a few temporary skin sutures often bring a marked relief to the breathing. Time is allowed for shock to pass off and dyspnea to diminish before operating.

Where there are separate entrance wounds in the chest and abdomen, provided the chest wound is not a blowing one, the abdomen is dealt with first, and only if the condition of the patient permits is the chest wound attended to.

When the wound is on the left side with the entrance wound about the level of the sixth to the eighth rib, with a high-up abdominal lesion, conservative treatment may be advisable, especially when the wound is from a rifle bullet which has passed through and through. Under other circumstances when the wound is more extensive intervention is called for. This is practiced by the transdiaphragmatic route because it saves time, gives access to the upper abdomen, is much easier than by laparotomy, and avoids the combined laparotomy and thoracotomy.

The chest wound, with all infected tissue, is widely excised and enlarged backward and forward until about five inches of the affected rib have been removed. With fresh instruments the pleura is opened freely, the hemothorax swabbed dry, and the chest cavity protected by large abdominal swabs. Having placed a self-retaining retractor in the wound, the rent in the diaphragm is found and enlarged up to four or five inches. The abdominal injury is reached in this way, and, when it has been dealt with, gloves and soiled instruments are changed, and closure of the diaphragm is accomplished by a continuous suture of chromic gut. Next, the lung is examined, and, where necessary, treated according to present-day methods. Suture of the parietal pleura may present difficulty, and when it cannot be sutured completely and a large gap is left, the lung is brought up and fixed by suture to the edges of the hole. This gives an air-tight closure to the cavity, and also acts as a barrier to any superficial sepsis which may subsequently develop. Closure of the wound in layers completes the operation.

On the left side, the wound of entrance being below the eighth rib, the abdominal condition is often more serious; frequently the chest escapes altogether, or is so slightly injured that it can be left out of consideration, in which case the abdomen is dealt with by laparotomy.

When, however, both chest and abdomen require attention, the following operation often can be employed, bearing in mind the

position of the missile: The chest is opened as described above and the incision carried forward on to the abdominal wall. By prolonging the wound in the diaphragm the parietal peritoneum may be opened to any required extent. The chest condition is dealt with, and the pleural cavity shut off by suture of the diaphragm to the chest wall just above the wound. The intraperitoneal injury can then be treated and the incision closed.

When the entrance wound is on the right side it is usually found that the metal, having penetrated the diaphragm, is lodged in the liver. If operation is indicated by the condition and size of the chest wound or by the retention of a large foreign body, it is practically the same as for the left side. Having opened the pleural cavity the rent in the diaphragm is then sought for and the metal removed from the liver by passing a forceps down the track. When, as frequently happens, the diaphragm is pierced near its attachment, the operation is to suture the edges of the hole in the diaphragm to the parietal pleura, and so effect direct drainage of the liver track with a completely closed pleural cavity. If injury to the abdominal viscera is suspected, the wound is treated as where there are separate entrance wounds in the chest and abdomen.

Of postoperative complications shock is the commonest and one of the most serious complications that may follow operation for penetrating abdominal wounds, and the means usually adopted to combat it are as described under preoperative treatment, with the additional use of rectal saline, or brandy and coffee when the degree of collapse is not extreme; cases with severe shock derive very little benefit from this method as it is seldom absorbed. Much more useful is the intravenous injection of a solution of 4-per-cent sodium bicarbonate or a 2-per-cent solution of gum acacia in normal salt solution. But where the loss of blood has been severe blood transfusion is the best remedy.

The Fowler position is adopted as soon as the patient has got over the shock of operation, and for twenty-four to forty-eight hours rectal saline with glucose is given. Bland fluid is the only thing given by the mouth for the first few days.

Paralytic ileus the author believes is always associated with peritonitis. Latterly several bad cases have recovered, the treatment consisting of frequent gastric lavage, intramuscular injections of pituitrin, appropriate saline, and the administration of enemata as required.

In a tabulation of 150 cases it is noted that 74 died, shock playing the largest part, peritonitis next in importance, and then pulmonary complications.

THE CHEMOTHERAPEUTIC TREATMENT OF GONORRHEA.

McDonagh *(The Practitioner,* May, 1918), surgeon to the Lock Hospital, notes that the mention of gonorrhea causes a look of despair on the face of the medical man nowadays, whilst twenty or thirty years ago it was considered no worse than a cold in the head. This difference of outlook he attributes to the overtreatment now imposed. Prompt treatment is strongly advised. The solution of choice is permanganate of potassium 1:8000, gradually increasing the strength, and in addition subcutaneous injections are given of an emulsion of colloidal antimony if the discharge has not ceased on the fourth day, sodium bicarbonate 60 grains a day being administered by the mouth. Colloidal manganese was also injected. As to the results the author states that the average stay in the hospital of gonorrheal patients is forty-nine days. About 15 relapsed in the same hospital. Probably not 5 per cent of the cases discharged are really cured. About 50 per cent develop prostatitis, 7 per cent vesiculitis, 15 per cent epididymitis, and 2 per cent arthritis.

In the 300 new cases treated by colloidal injections, 28 per cent developed prostatitis, 1 per cent vesiculitis, 4 per cent epididymitis, and there was no case of arthritis. Those cases did best which had an anterior

urethritis only on admission, and if such cases are always treated carefully and individually, there is no reason why the posterior part of the urethra should become involved or a complication develop.

Having treated 100 cases with the concentrated manganese, the following figures show the results obtained. The stay in hospital averaged twelve days; 9 per cent developed prostatitis, 2 per cent epididymitis, while there were no cases of vesiculitis or arthritis.

ACIDEMIA IN THE TREATMENT OF GAS GANGRENE.

ALMROTH E. WRIGHT and ALEXANDER FLEMING *(Lancet,* Feb. 9, 1918) record their observations, which show that a reduction in alkalinity of the tissues or blood greatly favors the multiplication of the several gas-forming bacilli, and further, that the growth of these organisms tends to produce an acidemia and a local reduction of alkalinity. Their predilection for dead or badly injured muscle is also due to the fact that such muscle has a reduced alkalinity. These observations lead the authors to recommend the practice of intravenous infusions of five-per-cent sodium bicarbonate solution in amounts of 500 mils at a time. This should be followed by an after-treatment with the lactate of soda by mouth to keep the urine alkaline. The lactate of soda is chosen because it is well borne by the stomach and promptly converted into the carbonate after absorption. It cannot be used at the outset owing to the presence of nausea and vomiting. When operation is necessary it should be preceded by the administration of a sodium bicarbonate infusion; and nitrous oxide and oxygen or warmed ether should be the anesthetic, preferably the former. Finally, the local wound or the amputation stump should be treated with five-per-cent solution of sodium chloride to promote the exudation of lymph and thus to raise the local alkalinity. The results of this plan of treatment have been good, and it is suggested that it may even forestall the development of acidemia if the infusions of alkali be started very early. Frequently, inoperable cases are rendered operable by the intravenous infusions.—*New York Medical Journal,* May 18, 1918.

THE WORKINGMAN'S HAND.

RISLEY *(Interstate Medical Journal,* April, 1918) under this title contributes a paper based on a large clinical experience and a careful study of the subject. He is particularly impressed with the value of the Zander methods. Closely following on intelligent incision, adequate drainage, and the subsidence of the infection process should be the institution of passive motion and massage. This should be started in the non-affected part of the hand at the very beginning of the subsidence of temperature, and should be extended to the involved areas as quickly as disappearance of tenderness and swelling will permit. By this means many days will be cut off from the period of disability and a vastly larger per cent of early useful fingers and hands will be produced.

Too much stress cannot be laid on this important adjunct to treatment. If it is persisted in from the very start the whole of this area is ready for use by the time the wound is healed and active Zander methods are ready to be started on the affected parts, thus shortening by a considerable number of days the time necessary to properly limber up the whole hand. The hand, of course, should always be returned to its splint after the daily Zander treatment until the danger of contracting scar and tendons is over. The author's hospital records show infinitely better results since the early institution of this treatment was recognized.

Zander treatment helps in another way also. It enables us to make an earlier prognosis of the ultimate result, and joints that do not limber up within four to eight weeks of persistent Zander treatment are very liable to fall into the group of unavoidably deformed hands, and as such are

watched carefully for the earliest opportunity to do some plastic operation or amputation of permanently stiff fingers. By thus carefully following up the Zander part of the treatment we can again affect favorably the economic end result, by earlier plastic surgery and hence earlier return to work.

Tendon involvement is unfortunately too common a sequence in sepsis of the fingers and hand. A careful study of the treatment of these hands previous to admission to the hospital leads one to believe that delayed incisions, ineffectual incision, and the so-called "cutting to the bone" are responsible for tendon sheath infection in most instances. In 77 cases the writer observed no involvement in 38, definite involvement in 26, uncertainty as to involvement in 5, and not stated in 8. Thus a trifle over one-third of a large variety of septic hands showed tendon sheath involvement. In cases with definite involvement the results were bad—*i.e.*, stiff fingers in spite of Zander treatment in 15, good in only 6, and unknown in 5.

An analysis of the results in this series of hospital cases, operated on by many surgeons and house officers, shows that out of 77 hands 9 obtained a perfect result, 19 a good result, 3 a fair result, implying some slight amount of deformity or disability, but not enough to prevent useful work; 9 poor results because of amputation of one or more fingers, and 7 because of contractures and stiff joints. The end results in 29 cases are not definitely known—*i.e.*, the patients have not been personally seen and inspected—but from an analysis of the history, operation, and last notes it seems probable that 9 of these were good, 4 were poor, and 16 remain entirely unknown. Thus 40 out of 77 cases, or about one-half, had what might be called a good result, while about one-third of the cases had a probable poor result. There were four deaths from sepsis and one from delirium tremens.

The author accentuates the great importance of considering the septic hand from an economic point of view from the very start of the infection till the man is back at work again; the great importance of bed treatment for every case of septic hand or hand infection; the reduction in the number of secondary operations necessary when this method is carried out, and the longer course of treatment necessary even under the most ideal out-patient or ambulatory treatment. Splints should always be employed at the very onset of every finger or hand infection.

Of the two forms of inefficient surgery, "cutting to the bone" is far more dangerous than the so-called medical incision, which often relieves tension and produces drainage enough to be helpful rather than otherwise. Lateral incisions are of greatest value and less liable to open up uninfected tendon sheaths. The high tourniquet producing a dry operative field is of utmost importance. Careful dissection under guidance of the eye is essential to success.

In the large percentage of cases the boric wick or rubber tissue with dry dressing is the best form of after-treatment where the process is localized. Wet dressings are indicated in diffuse infections.

THE SURGICAL TREATMENT OF EMPYEMA.

WHITTEMORE *(Boston Medical and Surgical Journal,* 1918; CLXXVIII) states that the old operation for empyema was exceedingly uninteresting and simple, but with a mortality of 20 per cent, with another 20 per cent becoming chronic. The danger following this operation is that the lung will not fully expand, but become covered with a thick pyogenic membrane—and then the case is chronic. Blow-bottles do little good in this stage. The author recommends in the desperately sick cases, under local anesthesia, to aspirate the chest through a large trocar; a catheter is then slipped through the trocar, and the trocar is removed. The catheter is attached to a long tube which reaches down to a bottle of sterile water. The catheter is sewed tightly in place. In this way negative pressure is obtained and the lung kept expanded. The catheter will remain tight about a week.

At the end of five or six days an electric suction apparatus is attached. The pus is measured, and when the amount is down to 2 ounces in twenty-four hours all drainage is removed. This method will probably cure the early cases in which there is only a cloudy serum. Where there is thick pus it is only done with the idea of tiding the patient over his desperate condition.

In the cases not so desperately sick the Lilienthal operation is the one of choice. A long incision between the ribs, almost from the vertebral column to the sternum, is made, a rib spreader applied, the cavity explored with the whole hand, pockets opened up, all the pus and lymph wiped out, and the pyogenic membrane covering the costal and visceral pleura removed. With positive pressure from a gas-oxygen machine, or by means of the intratracheal ether method, the lung is expanded till it is in contact with the chest wall. The wound is closed tight except for a cigarette drain at each end. This method is not nearly as dangerous and radical as it sounds. There is often no discharge except a little pussy serum, and at the end of a week or ten days the drainage is removed.

It is important in all cases in which there is a large amount of pus to have it escape slowly; otherwise there may be dangerous collapse due to the large open pneumothorax. If this condition occurs, rapid improvement may be got simply by tightly holding together the edges of the wound for a few minutes.

All cases should be operated as soon as the count shows 50 per cent polymorphonuclears in the exudate. The pneumococcus cases do well, the streptococcus cases very badly. Blow-bottle and breathing exercises should be instituted at once. With this treatment the mortality has been reduced from 20 to 12 per cent.

Exploratory thoracotomy should be freely practiced in suspected cases of encapsulated empyema. Intratracheal ether should be used. The patient should lie in the prone position, with arms extended upward.

In chronic cases a Schede operation plus a removal of the pleura is indicated. The wound should be closed tight. A small rubber tube is placed at the bottom, but this is tied off. At the end of forty-eight hours it is opened and the serum allowed to escape. It is then closed again. The earlier the radical operation is done the better the prognosis.—*Cleveland Medical Journal,* April, 1918.

BRAIN INJURIES.

SHARPE (*American Journal of Surgery,* Volume XXXII, No. 5), writing on this subject, notes that the end results of patients having injuries with or without a fracture of the skull have been an interesting study. It has become quite a common belief that once a man has had a fracture of the skull and then recovers, he is never the same person again. In 1912 the writer examined the records of three of the large hospitals of New York City during the decade of 1900-1910; the mortality of fractures of the skull was 46 to 48 per cent; the mortality of the patients operated upon was 87 per cent. This high percentage was due undoubtedly to the operation being postponed until the extreme stages of medullary compression and edema, and also to the fact that the operation performed was the "turning down" of a bone flap—a much more formidable procedure than a decompression—and then the replacing of the bone so that even the benefits of a decompression were prevented; besides, in many cases, the dura was not opened, and, as the dura is inelastic in adults, no adequate relief of the pressure could possibly be obtained.

Of the patients, however, who were finally discharged as "well" or "cured," Sharpe was able to trace only 34 per cent, but of these 34 per cent of the total patients found, 67 per cent were still suffering from the effects of the injury—that is, two-thirds of them were not as well as before the injury. The chief complaints were persistent headache, a change of personality of the depressed or of the excitable type and thus emotionally unstable, early fatigue,

making any prolonged mental or physical effort impossible and thus the inability to work, lapses of memory, spells of dizziness and faintness, and even epileptiform seizures in a small percentage of them.

In examining the hospital records of the patients having these post-traumatic conditions, it was interesting to ascertain that these were the patients—and there were but few exceptions—who regained consciousness gradually after several days and remained in the hospital for a period of four weeks and longer; whose charts made frequent mention of severe headache and low pulse-rate of 60, and in some cases below 60—that is, the usual clinical signs of an increased intracranial pressure. An ophthalmoscopic examination had rarely been made. Many of these patients still showed the results of the increased intracranial pressure in their fundi and by lumbar puncture, and these were the ones upon whom a cranial decompression even at this late date caused a marked improvement; the operative findings were always associated with a "wet," swollen, edematous brain.

TREATMENT OF WARTS.

MONTGOMERY *(California State Journal of Medicine,* Vol. XVI, No. 5) aptly observes that verruca may give rise to infinite annoyance, and may be exasperatingly pertinacious and recurrent.

Verruca of the scalp, incident to comb wounds, continually gives rise to slight hemorrhages, which glue the hairs together. Montgomery advises the curette for their eradication, the nose of the instrument being firmly pressed against the base of the growth, which readily scrapes off, leaving a freely bleeding surface level with the scalp, which is then treated with trichloracetic acid made fluid by adding a drop of water to a few crystals in a watch-glass. Thereafter the acid is sopped well with boric acid solution. He makes no mention of the possible feelings of the patient whilst this pleasant treatment is being carried on. He also speaks in enthusiastic terms of the value of the high-frequency spark for warts thus placed, but fails to caution against an almost explosive combustion of the hair which may enliven this procedure. The specific for warts on the edge of the eyelids is the oculist.

When warts are placed about or under the nails treatment is by radium, which the author states here shows at its best. When the warts are under the nail folds or free edge of the nails, forming a thickened, dirty colored, rough surface, which may easily be mistaken for an eczema, the horny covering should first be softened by a strong salicylic ointment (12 per cent) spread on a cloth, applied and covered with a rubber finger stall. The white dead epithelium is then removed with a curette, exposing the red papillary growth, which also should be curetted and treated with trichloracetic acid.

Verruca of the palmar surface is treated by applying a piece of adhesive plaster. After the epidermis has peeled off the wart is curetted and treated by trichloracetic acid or by *x*-rays or radium. Similar treatment is applied to warts of the sole of the foot. Salicylic acid, however, is here employed in the form of a salve, a mixture of lanolin and vaselin incorporating 12 per cent of the acid. This is buttered on a piece of cloth and spread over the affected sole. When the epithelium is thus softened the wart is again treated with trichloracetic acid, the author stating that because of the sensitiveness of the sole this must be done under general anesthesia. *X*-ray and radium are also excellent means of treating these warts. It is stated that these lesions of the sole require twice the radiations which would be efficient for other skin surfaces.

DETERMINATION OF TYPE AND SERUM TREATMENT IN PNEUMOCOCCUS INFECTIONS.

MCCLELLAND *(Cleveland Medical Journal,* April, 1918) gives a brief report of 117 cases of pneumococcus infection studied in the base hospital of Camp Beauregard during the months of January, February, and the early part of March, 1918. Of these, 113 were cases of lobar pneumonia

and four were cases of pneumococcus meningitis. Only one of the pneumonia cases was post-measles. Thirty-one of the Type I cases were treated with antipneumococcus serum intravenously—the first sixteen with polyvalent serum; the last fifteen with Type I serum. This serum seemed to produce specific curative effects, as evidenced by a prompt temperature response. On the average from 200 to 300 Cc. of the serum were used. The earlier the treatment the less the amount required. Two cases were given 500 Cc.; one case 600 Cc.; but in two of these three cases the treatment was started late (the eighth day). All had positive blood cultures, and only one, he in whom the treatment was begun early, survived.

In nine instances the pneumonia was postoperative—one was Type I, one was Type II, and seven were Type IV.

Many of the soldiers seem to be sensitive to horse serum. This will be increasingly so as time goes on. Four of the author's cases required desensitization. It is therefore most important to apply the preliminary tests before attempting the intravenous injection of the therapeutic dose. It should be noted that some patients who give strongly positive skin reactions can stand a fairly large intravenous injection provided it is given very slowly and discontinued promptly on the first signs of impending danger.

Empyema was the most serious complication, occurring in 12.4 per cent of the cases. Of the four Type I cases that died, all developed empyema and were operated on. In two of these there was, in addition, purulent pericarditis, and one also had purulent peritonitis. One Type IV case had a severe endocarditis, with almost complete destruction of the mitral valve, a vegetation on one of the cusps of the aortic valve, a sanguinopurulent pericarditis, and an encapsulated empyema, the latter unsuspected antemortem.

Following the therapeutic injection of serum, serum sickness was common, appearing thirty-three times, but never assumed alarming aspects. Of the four cases of pneumococcus meningitis, one was due to a Type I organism, and the remaining three were Type IV. All the latter followed mastoid operations. In the Type I case no portal of entry could be found, as there was no demonstrable pneumonia and no otitis. There was, however, a pneumococcus septicemia due to Type I organism. Specific treatment was begun on the third day of the disease, serum being given intravenously every eight hours and intraspinously every twelve hours. The patient died thirty-six hours after the first injection.

EVERY WAR WOUND, NOT CONTAINING STREPTOCOCCI, MUST BE SUTURED.

GROSS *(Bull. de l'Académie de Médecine,* No. 41, 1917, Séance 23) after an experience of several years with large incisions, then with excisions, says that surgeons at the front began to notice that certain wounds healed in so simple and natural a manner that the idea of primary suture suggested itself to them. The author claims to have been the first to practice complete closure of war wounds in the surgical automobile hospital No. 12, with varying success, but confesses that he did so without being able to base his observations on any scientific facts or to explain to himself why certain wounds cicatrized by first intention, while others, operated on under identical conditions, did not do so until about three months ago. The studies of Tissier furnished the desired information.

Tissier's conclusions were that it was the anaerobes which determined the putrid infection of war wounds, but that their development depended on the presence in the wound of dead tissue and on the simultaneous presence of one or more aerobes. The extension of the gangrenous process depends on the presence of the anaerobes and the aerobes associated with them. In the serious infections, this aerobe always is the streptococcus.

The practical conclusion is: That every war wound, not infected by the streptococcus, may be united by suture, after proper

surgical treatment, and ought to heal. If the bacteriological examination reveals the presence of streptococci, the sutured wound should be reopened; in every other case in which complete excision was done, it should be left alone after the patients have arrived at the hospital. The streptococcus, cultivated on a liquid medium, at 37°, will give the answer in five to six hours.

Of the 759 sutures, done by Tissier's method, between July 23 and September 10, fifty days, 675 healed by first intention, 47 healed partially, and 37 were reopened after the presence of streptococcus had been shown. The successes, therefore, amounted to 88.8 per cent.

Gross concludes that primary suture constitutes the rational treatment of war wounds; that the great merit of Tissier consists in his having shown that the quality of the infecting microbe alone is of importance; that the presence of the streptococcus alone should prevent the closure of a wound or cause its being reopened. This streptococcus is met with in from 10 to 15 per cent of war wounds of recent date; all the others should be closed.—*The Military Surgeon,* May, 1918.

POLLINOSIS OR HAY-FEVER AND ITS SPECIFIC TREATMENT.

Miller and Baetjer (*Southern Medical Journal,* Volume XI, No. 5) give detailed directions for the use of pollen extracts and state that from a most extensive series of cases (Cooke's) 75 per cent of the cases are relieved of 75 per cent or more of their symptoms and consequent discomfort. No one but a sufferer can truly appreciate what this really means. The writers' experience has been most gratifying, for, with but one exception, all of their cases have experienced tremendous relief, amounting in not a few instances to a complete absence of symptoms while living under the same conditions as before. A number of points of importance are worth mentioning:

In general, cases of ragweed pollinosis are more resistant than those of the vernal type.

Patients showing the highest grade of sensitization give the most brilliant therapeutic results and seem to require less treatment to control their symptoms.

In any case better results may be confidently expected with each successive year.

The question as to permanent cure is of course a pertinent one. Probably the so-called immunity which is manifested by the clinical alleviation or absence of symptoms is slowly lost during the winter, the patient gradually returning to the sensitive state. This point, however, is not settled. There are undoubted instances of spontaneous cure. The writers' work has led them to believe that even though complete and permanent desensitization may not occur, none the less each year's treatment effects a definite and permanent lowering of the patient's original reactivity. Improved methods of dosage and further immunological studies may show the way to secure permanent freedom from attacks.

In cases of pollinosis complicated by asthma, the results are often most satisfactory, particularly when suitable studies reveal a blood calcium deficiency which is adequately corrected. These conditions are most apt to be encountered in fat individuals showing polysensitization.

A great number of problems involved in the subjects of anaphylaxis and protein sensitization in general remain to be solved. Despite the incompleteness of our knowledge, we no longer need condemn the victim of pollinosis to six weeks of untold misery, or commend some long journey too often unsuccessful in its object. In active immunization with potent pollen extracts there is almost certain relief for the majority. In addition to this, of course, the patient's general health should be carefully watched, and all outspoken obstructive or infectious lesions of the nose, throat, or sinuses should be given appropriate treatment. Last, and by no means least, it is the duty of every progressive physician and citizen to work for the enactment of laws which will be effective in the ultimate eradication of weeds so needlessly the cause of intense suffering and great economic waste.

REVIEWS.

LOCAL AND REGIONAL ANESTHESIA. By Carroll W. Allen, M.D. With an introduction by Rudolph Matas, M.D. Second Edition. W. B. Saunders Co., Philadelphia, 1918. Price $6.50.

This is probably the most exhaustive work on this subject which has been published. Appearing for the first time in 1914, it has twice been reprinted and is now reset. It deals exhaustively with this entire matter and contains chapters on spinal, epidural, paravertebral, and sacral analgesia. It also considers the application of local and regional anesthesia to the surgery of the eye, ear, nose, throat, and teeth. A good working knowledge of the literature of this subject is shown by the text, and numerous illustrations are included to show the areas of the body in which injections should be made with the object of inducing local anesthesia. The author occupies a conservative position in regard to spinal analgesia, although distinctly favorable to it. To those who are particularly interested in this subject, and desire to practice it, Dr. Allen's text can be recommended with confidence.

DISEASES OF THE HEART: DIAGNOSIS, PROGNOSIS, AND TREATMENT BY MODERN METHODS. By Frederick W. Price, M.D., F.R.S. (Edin.). The Oxford University Press, London and New York, 1918.

The preface of this book states that its object is to present in as concise a form as possible information which will be of service in the diagnosis, prognosis, and treatment of diseases of the heart by modern methods. In other words, the author has approached the subject from the standpoint of the clinician, and has carefully avoided matter of merely theoretical interest. On the other hand, the fact that there is a chapter upon the electrocardiograph shows that the author recognizes fully this modern method of studying cardiology, although he also recognizes that the electrocardiograph is not available for the general practitioner.

The book covers less than 500 pages, and is printed in rather large type. There are 27 pages in which various methods of examining the heart and blood-vessels are described. In some parts of the book a very considerable amount of space is devoted to treatment, but in others the statements as to therapeutics are far too brief. Thus only seven lines are given to the treatment of Auricular Fibrillation, and it is stated that whether there be mitral disease, aortic disease, or disease of the myocardium, if the heart-rate be rapid, digitalis or one of its allies should be administered. While this statement may be true in part, it can hardly be considered as accurate. We are glad to note in the chapter upon chronic valvular disease that the author emphasizes the point that if there be no indication of cardiac failure, no direct treatment is needed. The book may be said to be exactly what is described in its title. It is not an exhaustive scientific treatise, but the work of an active practitioner.

THE ESSENTIALS OF MATERIA MEDICA AND THERAPEUTICS FOR NURSES. By John Foote, M.D. Third Edition, Revised, Enlarged, and Reset. The J. B. Lippincott Co., Philadelphia, 1918. Price $1.75.

The first edition of this book appeared in 1910, since which date it has been reprinted several times. The author tells us in his preface that the book has proved popular abroad as well as in this country, and that his design in preparing the text has been to give nurses information which will be useful to them before state examining boards. He has also embodied many suggestions received from training-school superintendents. Divided into three parts, the book deals in Part I with definitions, weights and dosage, the methods of administering medicine, and the preparation of antiseptic and other solutions. The fifth chapter in this book is entitled "How Medicines Act." This title does not give a clear idea of the contents of the chapter, since there is no description of how individual medicines produce their effects, but, on the contrary, a statement in a few brief paragraphs of the nervous system, the circulatory system, digestion, respiratory and body heat. Part II deals with drugs

and medicines, and Part III contains a list of drugs commonly used, including proprietary medicines, with a synopsis of the principal actions and uses of drugs and reference table of poisons and antidotes, and a chapter upon nurses and their relation to the Harrison Narcotic Act. There is also a chapter upon antiseptic solutions used in military surgery which we would have thought would have been included in Part I in conjunction with Antiseptic and Other Solutions. Finally, we have a number of formulæ varying from a liquid designed to attack moths to a fire-proofing solution.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., assisted by L. F. Appleman, M.D. Volume II. June, 1918. Lea & Febiger, Philadelphia, 1918.

This issue of "Progressive Medicine," like the June issue in previous years, contains an excellent article on Hernia by Dr. Coley of New York; one upon the Surgery of the Abdomen, Excluding Hernia, by Dr. Wilensky of New York; an exhaustive one on Gynecology, by Dr. Clark of Philadelphia; one upon the Disorders of Nutrition, Diseases of the Glands of Internal Secretion, Diseases of the Blood and Spleen, by Dr. O. H. P. Pepper of Philadelphia. The final article deals with Ophthalmology, and is by Dr. Jackson of Denver.

CLINICAL DIAGNOSIS. Fourth Edition, Revised and Reset, by James Campbell Todd, M.D. Illustrated. The W. B. Saunders Co., Philadelphia, 1918. Price $3.50.

The new edition of Dr. Todd's book on diagnosis contains 687 pages with 232 illustrations in the text, and 12 colored plates. It is a manual of laboratory methods and does not pretend to deal with diagnosis from the side of physical examination, which would naturally be expected in view of the fact that the author is a professor of clinical pathology in the University of Colorado. The first edition appeared ten years ago, and since that time the book has been reprinted on a number of occasions.

As the author well points out, any book which deals with clinical microscopy must contain accurate pictures of the structures described, since in this way only can accurate information be given. In the preparation of the present edition some of the illustrations which did not seem to be adequate in the earlier editions have been omitted and 90 others inserted, of which 57 are additional ones. The book gives every mark of being written by one who is familiar with his subject, and without doubt will continue to prove a popular work, as the book has been strengthened in every detail.

A LABORATORY MANUAL OF CHEMICAL ANALYSIS. For Students of Medicine, Dentistry, Pharmacy, and Science. By A. R. Bliss, Jr., M.D., Phm.D. Second Edition. W. B. Saunders, Philadelphia, 1918. Price $2.25.

This is a small volume of 194 pages, the scope of which is fairly well defined in its title. It is divided into three parts. Part I deals with the metals or cations, Part II with the acids or anions, while the pages in Part III deal with the "analysis of the unknown," of a metal or an alloy. As stated in the title the book is definitely intended for students, and not for the more advanced workers in chemical analysis.

COLLECTED PAPERS OF THE MAYO CLINIC. Volume IX. 1917. W. B. Saunders Company, Philadelphia and London, 1918. Price $6.50 net.

Again as a welcome guest comes the book containing the collected papers of the Mayo Clinic, greeted with equal welcome by those who have and those who have not seen the admirable workings of this great postgraduate medical school. Two most important papers are by Balfour, bearing on the Indications and Technic of Gastroduodenostomy and Restoration of Gastrointestinal Continuity by Means of Antecolic Gastrojejunostomy following Partial Gastrectomy for Cancer of the Pyloric end of the Stomach. A brief, highly suggestive paper from Charles H. Mayo on the Use of the Omentum in the Prevention and Healing of Fistula follows. William J. Mayo contributes a paper on Diverticulum of the Large Intestine; a study of the Recto-

Sigmoid and the Relation of the Spleen to Certain Obscure Clinical Phenomena. Another contribution is by Judd and Braasch upon the Advisability of Prostatectomy in Cord Lesions, and a contribution by Judd on Tumors of the Urinary Bladder. Beckman's work on Spina Bifida; Braasch's Studies on the Urinary Tract; MacCarty's lucid and simplified exposition of Cancer—Its Place in Biology and its Nomenclature, follow. Rosenow's extraordinary studies on Serum and Infections; Stokes's splendid contributions to the clinical aspect of Syphilis next demand attention. These and many other studies bring to him who has high ideals as to his responsibilities and power of service that stimulation and help which he most needs to keep him in the forefront of progress. This is an essential book to every surgeon in the land; a desirable book for every internist.

THE PREVENTION OF VENEREAL DISEASES. By Otto May, M.A., M.D. (Cantab.), M.R.C.P. (London). Henry Frowde, Oxford University Press; Hodder & Stoughton, London, 1918. Price $3.

There are comparatively few people who have the courage of their convictions. Among this chosen number Dr. May may rightly be classed, since at the time when such action was by no means popular and many people were most likely to misunderstand it, he resigned the office of Honorary Secretary of the National Council because this august body decided to refrain from permitting the provision of prophylactic outfits as a part of its policy. He states in his introduction as a fundamental proposition that an individual, on reaching proper maturity, should be able to satisfy the instinct by suitable mating, that the disharmony between sexual and economic maturity is at the root of the trouble, and until this disharmony is abolished the hope of extinguishing sex irregularity must remain a Utopian dream.

Much, however, can be done to keep it within bounds, and an enormous amount of this irregularity is the result of preventable causes, such as deficient training in self-control and the existence in our social system of many factors calculated to excite sexual desire. As for the part played by medical science, we must provide methods of efficient treatment; we must furnish methods of preventing or aborting the development of disease, or run the risk of infection.

The first chapter is devoted to Educational Instruction. He would eliminate the stork as a causative factor in the multiplication of species and give the children a simple true statement of the facts of birth.

There is a chapter on Treatment in Relation to Prevention, excellent in all its teaching, a chapter on Prostitution and Venereal Diseases with highly suggestive statistics, and a chapter on Artificial Prophylaxis follows. Concerning the outfits issued to soldiers, it is stated that if used according to directions as to the method and time the protection afforded by them is absolute. The unknown factor is the care which will be exercised in carrying out the proper routine.

Other chapters are headed Venereal Disease and Marriage; Lectures to Troops and Institutions Available for Free Treatment. There is an appendix containing New Zealand's Social Hygiene Act.

An excellent book, written for a purpose which will in part be surely fulfilled.

THE HOSPITAL AS A SOCIAL AGENT IN THE COMMUNITY. By Lucy C. Catlin, R.N. Illustrated. W. B. Saunders Company, Philadelphia and London, 1918.

Miss Catlin has written this book to present especially to those engaged in hospital Social Service certain principles which she has found effective in establishing, developing, and maintaining this department in hospitals. The book is intended as a guide to social workers whose activities are manifested in this direction. Forms of blanks which have proved comprehensive are reproduced in the appendix. The first chapter gives the reason for the existence of Social Service in Hospitals, and thereafter follow sections on Organization and Correlation. It is clearly and succinctly shown that by means of social service workers the efficiency of the

hospital in both its immediate treatment and in accomplishing its ultimate end, *i.e.*, to cure people completely and promptly, is enormously helped. Case histories are recorded, classifications are taken from daily experience, and the place of the hospital in public health work is set forth. An admirable book, helpful not only to the beginner in this line of work, but also to those who are well advanced.

THE DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES IN GENERAL PRACTICE. By L. W. Harrison, D.S.O. Henry Frowde, Oxford University Press, London, 1918.

Harrison in his preface speaks with some enthusiasm of his subject and states that he has introduced many members of the profession to its study and has almost invariably found that a closer acquaintance has changed an attitude of indifference, or even of disgust, to one of the keenest interest. He states he has written the book to help every medical practitioner to "pull his weight," and acknowledges large indebtedness to D'Arcy Power's "A System of Syphilis." The book does not depart from the standard type, excepting perhaps it is somewhat more casual. The classification of Lesions of the Penis is extremely simple, those which are syphilitic and those which are not, mixtures of A and B, and a fourth heading, under which might readily have been included the first two, entitled Papillomatous Lesions. As a test for cure he advises the use of a vaccine, the author stating that this will sometimes cause a discharge. Under one chapter are grouped the Scrotum and its Contents, the Inguinal Region, Anus, and Rectum. Thereafter follow the Trunk and Limbs, and, of course, the Hands and Feet and Head and Neck. This grouping of lesions is not without its merit in the line of simplification. There is a colored picture of homonymous hemianopsia, and there are helpful chapters on the taking of specimens for laboratory examination, microscopic examinations, and laboratory reports. It is cheering to find that in the treatment of Gonorrhea copaiba and cubebs are not neglected. It is stated that when a patient with gonorrhea applies for advice within a few hours or days of exposure, forcing the glans with alcohol, irrigating the anterior urethra with 1:2000 permanganate of potassium, and instilling into it 30-per-cent calomel cream of fluid consistency will probably abort the disease in the great majority of instances. After the disease has developed, *i.e.*, if there is a discharge, the abortive treatment recommended is irrigation of the anterior urethra with 1:3000 permanganate of potassium, or 1:500 argyrol. Inject into the urethra about 4 Cc. of a 10-per-cent solution of argyrol, instructing the patient to hold it there for twenty minutes. Repeat the irrigation and injection twice daily for three days, and continue with irrigations for five days longer.

Janet's method of treatment is given in brief detail. Mention is also made of vaccines.

The treatment of Syphilis follows the ordinary lines. There is an appendix which gives a list of instruments commonly used in the treatment of venereal diseases. A second appendix contains formulæ. An excellent summary of the accepted beliefs and practices regarding venereal diseases is supplied.

THE TREATMENT OF WAR WOUNDS. By W. W. Keen, M.D., LL.D. Second Edition. W. B. Saunders Company, Philadelphia and London, 1918.

This represents an interesting résumé of some phases of war literature, Bipp, Dichloramine-T, and Carrel-Dakin being generally covered. Cushing's article in the *British Medical Journal* is abstracted, as are other contributions bearing on Wounds of the Chest, Abdomen, etc. The book closes with a Bibliography on Rehabilitation of Crippled Soldiers and an Appendix on the "Cotton-Process" Ether, which may still be regarded as in its purely experimental stage.